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CARCINOGENESIS ABSTRACTS

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CARCINOGENESIS ABSTRACTS

National Cancer Institute

U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
Public Health Service National Institutes of Health

Volume XIV, No. 9
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CARCINOGENESIS ABSTRACTS

A monthly publication of the

National Cancer Institute

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PREFACE

Carcinogenesis Abstracts is a publication of the National Cancer Institute. The journal serves as a vehicle through which current documentation of carcinogenesis research highlights are compiled, condensed, and disseminated on a regular basis. It represents an integral part of the Institute's program of fostering and supporting coordinated research into cancer etiology. Issues of *Carcinogenesis Abstracts* normally contain three-hundred abstracts and three-hundred citations (unaccompanied by corresponding abstracts). Abstracts and citations refer to the current scientific literature that describes the most significant carcinogenesis research carried on at the National Cancer Institute, other governmental agencies, and private institutions. *Carcinogenesis Abstracts* is intended to be a highly useful current awareness tool for scientists engaged in carcinogenesis research or related areas. The great number and diversity of publications relevant to carcinogenesis make imperative the availability of this service to investigators whose work requires that they keep abreast with current developments in the field.

Carcinogenesis Abstracts is normally published monthly. Volume XIV covers the scientific literature published from Jan 1976 through Dec 1976. To increase the usefulness of *Carcinogenesis Abstracts*, Volume XIV, a Wiswesser Line Notation index and a Chemical Abstracts Service Registry Number index have been provided. These indexes reference compounds described in abstracted articles. A cumulative subject, author, CAS Registry Number, and Wiswesser Line Notation index for Volume XIV will be published shortly after the final regular issue.

Carcinogenesis Abstracts is available free of charge to libraries and to individuals who have a professional interest in carcinogenesis. Requests for *Carcinogenesis Abstracts* from qualified individuals should include statements of their relationship to carcinogenesis research. All correspondence should be addressed as follows.

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The Secretary of Health, Education and Welfare has determined that the publication of this periodical is necessary in the transaction of the public business required by law of this Department. Use of funds for printing this periodical has been approved by the Director of the Office of Management and Budget through November 30, 1977.

NOTE

Journal names are abbreviated according to the list of abbreviations used by *Index Medicus*. For journals not covered by *Index Medicus*, the abbreviations found in *Chemical Abstracts Service Source Index*, 1907-1974 Cumulative, are used. New journals are verified in *New Serial Titles* and abbreviated according to *International Standard ISO 833*. An asterisk indicates the author to address (other than the primary) in requesting reprints.

LANGUAGE ABBREVIATIONS

Afr.	Afrikaans	Ind.	Indonesian
Ara.	Arabic	Ita.	Italian
Bul.	Bulgarian	Jpn.	Japanese
Chi.	Chinese	Kor.	Korean
Cro.	Croation	Lav.	Latvian
Cze.	Czech	Lit.	Lithuanian
Dan.	Danish	Nor.	Norwegian
Dut.	Dutch	Pol.	Polish
Eng.	English	Por.	Portuguese
Est.	Estonian	Rum.	Rumanian
Fin.	Finnish	Rus.	Russian
Fle.	Flemish	Ser.	Serbo-Croatian
Fre.	French	Slo.	Slovak
Geo.	Georgian	Spa.	Spanish
Ger.	German	Swe.	Swedish
Gre.	Greek	Tha.	Thai
Heb.	Hebrew	Tur.	Turkish
Hun.	Hungarian	Ukr.	Ukrainian
Ice.	Icelandic	Vie.	Vietnamese

ABBREVIATIONS USED IN ABSTRACTS

A	angstrom(s)	µM	micromolar
ACTH	adrenocorticotropic hormone	mOsm	milliosmolar
ADP	adenosine diphosphate	max	maximum
AMP	adenosine monophosphate	mEq	milliequivalent(s)
ATP	adenosine triphosphate	min	minute(s)
approx	approximately	ml	milliliter
av	average	µl	microliter(s)
BCG	bacillus Calmette-Guerin	mm	millimeter(s)
bid	twice daily	mo	month(s)
C	degree(s) centigrade	N	normal concentration
cal	calorie(s)	NAD	nicotinamide adenine dunucleotide
kcal	kilocalorie(s)	NADH	reduced nicotinamide adenine dinucleotide
cc	cubic centimeter(s)	NADP	nicotinamide adenine dinucleotidephosphate
Ci	curie(s)	NADPH	reduced nicotinamide adenine dinucleotide-phosphate
mCi	millicurie(s)	NCI	National Cancer Institute
µCi	microcurie(s)	NIH	National Institutes of Health
cm	centimeter(s)	PAS	periodic acid--Schiff
CNS	central nervous system	po	orally
cpm	counts per minute	ppb	parts per billion
DNA	deoxyribonucleic acid	ppm	parts per million
ED_{50}	median effective dose	R	roentgen
EDTA	ethylenediamine tetraacetic acid	RBC	red blood cells (erythrocytes)
g	gram(s)	RNA	ribonucleic acid
kg	kilogram(s)	rpm	revolutions per minute
mg	milligram(s)	sc	subcutaneous
µg	microgram(s)	sec	second(s)
Hb	hemoglobin	SGOT	serum glutamic-oxalacetic transaminase
hr	hour(s)	SGPT	serum glutamic-pyruvic transaminase
ia	intra-arterial	soln	solution
id	intradermal	TCD	tissue culture dose
ILS	increased life span	TCD_{50}	median tissue culture dose
im	intramuscular	tid	three times daily
ip	intraperitoneal	UV	ultraviolet
IU	International Unit(s)	WBC	white blood cells (leukocytes)
iv	intravenous	wk	week(s)
Km	Michaelis constant	wt	weight
LD	lethal dose	x	times
LD_{50}	median lethal dose	yr	year(s)
M	molar		

CONTENTS

	Cross Reference Abbreviations	Abstracts, Citations	Page
REVIEW	(Rev)	4801-4879	747
CHEMICAL CARCINOGENESIS	(Chem)	4880-4956	761
PHYSICAL CARCINOGENESIS	(Phys)	4957-4986	775
VIRAL CARCINOGENESIS	(Viral)	4987-5091	780
IMMUNOLOGY	(Immun)	5092-5145	795
PATHOGENESIS	(Path)	5146-5266	802
EPIDEMIOLOGY AND BIOMETRY	(Epid-Biom)	5267-5331	820
MISCELLANEOUS	(Misc)	5332-5400	829
AUTHOR INDEX			
SUBJECT INDEX			
CHEMICAL ABSTRACT SERVICES REGISTRY NUMBER INDEX			
WISWESSER LINE NOTATION INDEX			

4801 MUTAGENICITY STUDIES ON ORGANOPHOSPHORUS INSECTICIDES. (Eng.) Wild, D. (Zentrallaboratorium fuer Mutagenitaetspruefung der Deutschen Forschungsgemeinschaft, Freiburg i. Br., West Germany). *Mutat Res* 32(1975): 133-150; 1975.

Some results of tests to determine the potential genetic hazard of organophosphorus insecticides and their metabolites are presented. The common names, pesticide index numbers, scientific names and structures of the organophosphates are tabulated. Organophosphorus insecticides are chemical alkylating agents; alkylation of DNA bases in *Escherichia coli* and HeLa cells was demonstrated with dichlorvos. Induction of gene mutations in microorganisms in vitro was demonstrated with Bidrin, dichlorvos, dimethoate, methylparathion, and oxydemetonmethyl at 10^{-3} M or higher concentrations. Comparison of the dose-effect relationships seen in several microbial systems suggested that the absence of detectable mutagenic effects at lower concentrations was due to a sensitivity threshold of the individual test system. Misrepair of the primary lesions appeared to be an additional requirement for dichlorvos-induced mutants in *E. coli*. An indirect mechanism (perhaps via protein alkylation) is probably involved in the induction by dichlorvos of DNA disintegration. In a relatively insecticide-resistant *Drosophila* strain, oxydemetonmethyl was a weak mutagen; a lower dose in a normal strain had no effect. Microbial mutation tests with mono- and di-esters of phosphoric acid were negative. It is suggested that under conditions of normal use, dichlorvos may not exert significant mutagenic effects in mammals, including man. (50 references)

4802 STERIGMATOCYSTIN. (Eng.) IARC Working Group. *In: IARC Monographs on the Evaluation of Carcinogenic Risk of Chemicals to Man: Some Naturally Occurring Substances. Meeting Held in Lyon, 7-13 October 1975.* International Agency for Research on Cancer. (Lyon, France): vol. 10, pp. 245-251; 1976.

Some chemical and physical data and biological data concerning its carcinogenicity to man have been listed for the mycotoxin sterigmatocystin, which has been found as a contaminant of country-cured hams, wheat, and green coffee beans. No data concerning carcinogenicity in man are available, but it was shown to be carcinogenic in rats following oral, topical, or sc administration. When Wistar rats were fed 0.15-2.25 mg/day for 52 wk, 39/50 developed hepatocellular carcinomas within 123 wk. Skin papillomas and carcinomas occurred in 10/20 rats given 1 mg of sterigmatocystin twice weekly for 70 wk by application to the shaved dorsal skin in dimethylsulfoxide or acetone; hepatocellular carcinomas also occurred in 12 rats. Local sarcomas occurred in 3/6 rats treated twice weekly with 0.5 mg of the substance (sc, in arachis oil) for 24 wk, one rat also developing a hepatoma and one rat a cholangioma. Sterigmatocystin has also been shown to be carcinogenic in mice following oral administration: 21/25 ICR mice of both sexes fed a diet containing 5 ppm sterigmatocystin for 58 wk developed pulmonary adenomas (compared to 4/37 in control mice); adenocarcinomas of the lung occurred in 9/25 treated mice, but in none of controls. (23 references)

4803 SUBSTANCES WITH CARCINOGENIC ACTIVITY (SECOND EDITION). (Ger.) Teichmann, B. (Zentralinstitut fuer Krebsforschung der AdW der DDR, DDR-1115 Berlin-Buch, Lindenberger Weg 80, East Germany); Schramm, T. *Arch Geschwulstforsch* 46(2): 146-149; 1976.

A brief review of a handbook listing known chemical carcinogens is presented. The criterion for inclusion is given as any agent that so affects biochemical regulatory mechanisms that normal cells are transformed or nesting cancer cells stimulated to tumor formation. Since the information will be used to forecast potential risk factors, agents are included according to the following properties: (a) carcinogenesis as an effect of total dose; (b) additive effects of partial doses, including the effect of number, amount, and schedule of administration or exposure on latency; (c) syncarcinogenicity, including the inhibitory effect of a second chemical on the carcinogenicity of another; (d) cocarcinogenicity; (e) portal of entry effects, if any; and (f) metabolic discrimination as to proximal, penultimate, or ultimate forms. Data on the size and shape of physical materials (plastics, etc), the implantation of which--especially in rats--is carcinogenic and data on carcinogenic mixtures (tars, etc.) are included in appendices. (9 references)

4804 SENKIRKINE. (Eng.) IARC Working Group. *In: IARC Monographs on the Evaluation of the Carcinogenic Risk of Chemicals to Man: Some Naturally Occurring Substances. Meeting Held in Lyon, 7-13 October 1975.* International Agency for Research on Cancer. (Lyon, France): vol. 10, pp. 327-331; 1976.

Some physical and chemical data and biological data relevant to the possibility of carcinogenicity to man have been listed for the pyrrolizidine alkaloid senkirkine, which occurs in certain species of the plant tribe Senecioneae and in *Crotalaria laburnifolia*. Human case reports or epidemiological studies are not available, and carcinogenicity studies of the pure compound have not been made. However, senkirkine is toxic to rats: weanling rats given 300 mg/kg of the compound by stomach tube died within a few days with liver lesions typical of those induced by pyrrolizidine alkaloids. Rats 1-4 days old were more sensitive and died within a few days of receiving 50 mg/kg sc or ip. (9 references)

4805 CURRENT TRENDS IN CHEMICAL CARCINOGENESIS. (Fre.) Fuchs, R. P. P. (Laboratoire de Biophysique de l'I.B.M.C. de Strasbourg, Strasbourg, France). *La Lutte Contre le Cancer* (208): 1-5; 1975.

Most chemical carcinogens are actually precarcinogens that are metabolized, generally in an electrophilic reaction, into active carcinogens. The induction of liver cancer in rats by specific carcinogens can be reduced by the simultaneous administration of nucleophilic compounds capable of reacting with the carcinogens. This treatment inhibits the transition of a precarcinogen to a carcinogen. Cancer frequency can also be reduced by stimulating cellular detoxification enzymes. The importance of enzymes in carcinogenesis is emphasized in that smokers with low monooxygenase (an enzyme which transforms precarcinogens to their ultimate metabolites) activity have a lower incidence (1/36) of lung cancer than smokers with high enzyme activity. The carcinogenic effect involves DNA modification. The potent carcinogen 7-fluoro-2-aminoacetylfluorene drastically alters DNA structure in vitro while the noncarcinogenic 7-iodo-2-aminoacetylfluorene does not. The specificity of certain carcinogens to certain tissues is probably due to the presence of precarcinogen metabolites in the tissue. These carcinogens may react in vivo only with DNA which is not bound to histone. (No references)

4806 JACOBINE. (Eng.) IARC Working Group. *In: IARC Monographs on the Evaluation of the Carcinogenic Risk of Chemicals to Man: Some Naturally Occurring Substances. Meeting Held in Lyon, 7-13 October 1975.* International Agency for Research on Cancer (Lyon, France): vol. 10, pp. 275-279; 1976.

Some chemical and physical data and biological data concerning potential carcinogenicity to man have been listed for the pyrrolizidine alkaloid jacobine, which occurs in certain *Senecio* species, one of which, *S. jacobaea*, has been used as a medicinal herb in Europe. No case reports or epidemiological studies regarding its carcinogenic risk to man are available, nor are data available from animal studies with the pure compound. However, doses of 0.08 µl of jacobine (of unspecified purity) in 0.7% sodium chloride injected into the abdomen of *Drosophila melanogaster* males proved to be weakly mutagenic when effects on the induction of sex-linked recessive lethal mutations were scored. (10 references)

4807 SAFROLE, ISOSAFROLE AND DIHYDROSAFROLE. (Eng.) IARC Working Group. *In: IARC Monographs on the Evaluation of the Carcinogenic Risk of Chemicals to Man: Some Naturally Occurring Substances. Meeting Held in Lyon, 7-13 October 1975.* International Agency for Research on Cancer (Lyon, France): vol. 10, pp. 231-244; 1976.

Some chemical and physical data, details of natural occurrence and production, and biological data relevant to possible carcinogenicity to man have been listed for safrole and its derivates isosafrole and dihydrosafrole. Data regarding carcinogenicity in man are not available, but much experimental evidence indicates that all three compounds are carcinogenic in rodents. When safrole (5,000 ppm) and isosafrole (5,000 ppm) were fed to Osborne-Mendel rats of both sexes for 2 yr, liver tumors occurred in 19/47 animals (14 tumors being hepatocellular carcinomas and cholangiocarcinomas) and 5/20 animals (2 tumors being hepatic cell adenomas and 3 hepatic cell carcinomas), respectively. Feeding with dihydrosafrole (10,000 ppm) resulted in 75% of the treated rat population developing tumors of the esophagus (papillomas and epidermoid carcinomas). Safrole (464 mg/kg/day for 21 days by stomach tube, then 1,112 ppm in diet) and isosafrole (215 mg/kg/day for 21 days by stomach tube, then 517 ppm in diet) also produced liver tumors in (C57BL/6 x C3H/Anf)F_1 mice of both sexes, with an incidence of 27/33. Dihydrosafrole administration (464 mg/kg/day for 21 days, then 1,400 ppm in diet) resulted in liver tumors in 10/17 males and 0/17 females. Safrole (6.6 mg total in four sc inoculations) induced liver tumors in male (18/31), but not female (0/29), infant Swiss albino mice. (34 references)

4808 LASIOCARPINE. (Eng.) IARC Working Group. *In: IARC Monographs on the Evaluation of the Carcinogenic Risk of Chemicals to Man: Some Naturally Occurring Substances. Meeting Held in Lyon, 7-13 October 1975.* International Agency for Research on Cancer (Lyon, France): vol. 10, pp. 281-290; 1976.

Chemical and physical data and biological data pertaining to its carcinogenicity to man have been listed for the pyrrolizidine alkaloid lasiocarpine, which occurs in certain plant species of the family Boraginaceae, some of which have been used medicina in India and the Eastern Mediterranean. No case reports or epidemiological studies concerning the carcinogenicity to man of lasiocarpine are availabl but the alkaloid was shown to be carcinogenic in rats following ip injection. Of 25 male Fischer 344 rats treated with lasiocarpine (7.8 mg/kg twice weekly for 4 wk then once a week for 52 wk), 16 developed tumors (hepatocellular carcinomas in 10 rats, squamous cell carcinomas of the skin of the back in 6, pulmonary adenomas in 5, adenocarcinomas of the small intestine in 2, a cholangiocarcinoma i 1, an adenomyoma of the ileum in 1, and an interstitial cell tumor of the testis in 1) after 60-76 wk. No other routes of administration or species have been adequately tested. (38 references)

4809 TANNIC ACID AND THE TANNINS. (Eng.) IARC Working Group. *In: IARC Monographs on the Evaluation of the Carcinogenic Risk of Chemicals t Man: Some Naturally Occurring Substances. Meeting Held in Lyon, 7-13 October 1975.* International Age for Research on Cancer. (Lyon, France): vol. 10, p 253-262; 1976.

The chemical and physical properties of tannic aci and the tannins and biological data relevant to th possibility that these substances may be carcinoge to humans are listed. They are found in most forms of vegetation, with particularly high levels in th bark of the oak, eucalyptus, mangrove, hemlock, pi and willow; the wood of the quebracho, chestnut an oak; the fruits of the tara, myrobalans and divi divi; the leaves of the sumac and gambier; and the roots of the canaigre and palmetto. Tannic acid ha many industrial uses, is used medicinally, and is consumed as a natural component of coffee and tea and as an added flavoring ingredient for other foodstuffs and beverages. No case reports or epidemiological evidence concerning carcinogenicity with human exposure to tannic acid or the tannins are available, but tannic acid was shown to be carcinogenic in rats following sc injection. Of 23/28 surviving white rats treated every fifth day for 290 days with tannic acid (150 mg/kg initially, 200 mg/kg later), 5 developed hepatomas and 6 developed cholangiomas; these were rare spontaneously occurring tumors in this rat colony. In mice, sc injection of hydrolyzable tannins extracted from various plant materials produced liver tumors, and injection of condensed tannins produced both local sarcomas and liver tumors (dose and number of animals not specified). (34 references)

4810 ISATIDINE. (Eng.) IARC Working Group. *In: IARC Monographs on the Evaluation of the Carcinogenic Risk of Chemicals to Man: Some Naturally Occurring Substances. Meeting Held in Lyon, 7-13 October 1975.* International Agency for Research on Cancer. (Lyon, France): vol. 10, pp. 269-273; 1976.

Some chemical and physical data and biological data relevant to the possible carcinogenic hazard to man have been listed for the pyrrolizidine alkaloid isatidine, which occurs in species of *Senecio* and *Crotalaria*. No data from human case reports or epidemiological studies are available, but isatidine was shown to be carcinogenic in rats. Of 22 albino Wistar rats (8 male, 14 female) treated with isatidine in drinking water at a concentration of 0.05 and then 0.03 mg/ml for 3 days/wk for about 20 mo, 5 had nodular hyperplasia of the liver and 5 males and 5 females had multiple hepatomas with atypical hyperplasia of the endothelial cells. Isatidine is reduced to retrorsine in the intestinal tract of rats, possibly by the gut flora, which accounts for the large increase in toxicity when it is administered po (LD_{50} = 48 mg/kg) rather than parenterally (LD_{50} = 250 mg/kg, ip). (12 references)

4811 MYCOTOXINS AS CAUSE OF DISEASES IN MAN. (Ger.) Gedek, B. (Fachbereich Tiermedizin, Universitaet Munich, Veterinarstrasse 13, 8 Munich 22, West Germany). *Fortschr Med* 94(12): 694-701; 1976.

A review of the sources, distribution, pathology, dose-response relations, environmental exposure, nutritional risk, metabolic fate, and carcinogenicity of mycotoxins is presented. The unusual sensitivity of the liver, regardless of portal of entry, is surveyed in depth. Cutaneous application of aflatoxin B_1, the most potent mycotoxin, and related compounds elicits parenchymal changes within 24 hr, with no residual reaction on the skin. No correlation can be established between the LD_{50} for a given species and the carcinogenic dose, nor between LD_{50} and hepatotoxic dose. There is no known structure common to tumorigenic mycotoxins, although a lactone ring, even if unsaturated in the α- and β-positions, occurs frequently. It would appear that mycotoxins function as alkylating agents, actively intervening in DNA-RNA synthesis. Mention is also made of the correlation between the extent of environmental contact with the fungus and neoplastic frequency. Cancer incidence is higher in homes or villages known to sequester the fungus. The mycoflora of a house, for example, has been matched to that of its leukemic residents. (12 references)

4812 AFLATOXINS AND HEPATIC CANCER. (Fre.) Payet, M. (No affiliation given). *Med Chir Dig (Suppl 2)* 57; 1975.

There is some controversy about the role of aflatoxins in the pathogeny of liver cancers. The fungus *Aspergillus flavus* may contaminate not only the peanut but all oil-yielding plants. Industrial extraction processes guarantee the elimination of all traces of aflatoxin from cooking oils, so the role of aflatoxins can only be considered in relation to the human consumption of the residues from these processes (oil cakes). Although this consumption would seem to be equal for both sexes, primary cancer of the liver occurs five times more frequently in men than in women. In 1963, experiments showed that following the addition of a weak dose of aflatoxin to their diet, white Wistar rats developed cancer within 3 mo, after a phase of cirrhosis. These results have been achieved experimentally only in selected purebred rats. Wild rats, even in countries with high peanut and oil cake contamination, do not spontaneously develop cancer. Peanut contamination exists in all countries of the tropical zone and yet, only some of these countries have a high rate of hepatic cancer. Aflatoxins are probably not an exclusive or specific factor but just one possible factor among others in the genesis of this cancer. In conclusion, one ''very curious'' incident is described. During an experiment in Dakar, Senegal, in 1952, several infants of 6 to 12 mo received peanut oil cake food supplements. At the age of 7, two of these children presented definite histological alterations of the liver. A biopsy of one of them revealed a precirrhotic condition. In 1970, it was learned that one had died from a confirmed hepatic carcinoma. Reference samples of the original oil cakes were traced and found to be contaminated by *Aspergillus flavus*. (No references)

4813 ARSENIC TOXICOLOGY AND INDUSTRIAL EXPOSURE. (Eng.) Pinto, S. S. (ASARCO, Inc., P.O. Box 1677, Tacoma, WA 98401); Nelson, K. W. *Ann Rev Pharmacol Toxicol* 16: 95-100; 1976.

The frequently conflicting literature relating to the carcinogenicity of arsenicals is reviewed. Although it is not confirmed in any animal model system, most of the literature suggests a low-grade carcinogenic activity of arsenic, with lung cancer being the most prevalent type. The importance of cocarcinogenic factors is stressed. Like many chemotherapeutic agents, arsenic has both antimitotic properties (used clinically to treat psoriasis and chronic myelocytic leukemia) and carcinogenic properties. Because arsenic compounds vary in their degree of carcinogenicity, no single safe level of exposure can be determined. (20 references)

4814 CARCINOGENS ARE MUTAGENS: A SIMPLE TEST SYSTEM.

(Eng.) Ames, B. N.; McCann, J. *In: Screening Tests in Chemical Carcinogenesis. Meeting Held in Brussels, 9-12 June 1975.* Edited by R. Montesano; H. Bartsch; L. Tomatis; W. Davis. International Agency for Res. on Cancer. (Brussels, Belgium): no. 12, pp. 493-501, 503-504; 1976.

It is suggested that most carcinogens cause cancer through somatic mutation; of 174 carcinogens tested, 156 demonstrated mutagenic activity by reverting histidine-requiring strains of *Salmonella* bacteria to prototrophy in the presence of an activating rat (or human) microsomal system. *S. typhimurium* strain TA1535 was used to detect base-pair substitutions, and strains TA1537 and TA1538 were used to detect frameshift mutations, their sensitivity having been increased by the introduction of two mutations. One mutation (*uvrB*) causes loss of the excision repair system, and the other (*rfa*), loss of the lipopolysaccharide permeability barrier. Two new tester strains, TA100 and TA98, have been developed by the transfer of a resistance factor, pKM101, to TA1535 and TA1538, respectively. The system may be used to determine the mutagenicity of complex mixtures, including that of glucuronidated metabolites in urine (with β-glucuronidase). Mutagenic activity has been detected in soot from city air, in cigarette smoke condensate, in 150/169 commercial oxidative-type hair dyes, and in slices of fish sausage treated with the antibacterial food additive, furylfuramide. This additive has recently been shown to be carcinogenic in animal tests. Another example of mutagenicity predating demonstration of carcinogenicity was provided by ethylene dibromide, a widely used industrial chemical and gasoline additive. Attention is also drawn to the mutagenicity of chloroacetaldehyde (a likely metabolic product of the common industrial chemicals chloroethanol and 1,2-dichloroethane) and ethidium bromide (a common laboratory reagent). It is proposed that the *Salmonella* microsome mutagenicity test be used to screen all food additives, drugs, and other chemicals to which humans are exposed. (25 references)

4815 ADDITION OF AMINO ACIDS AND RELATED SUBSTANCES TO NUCLEIC ACIDS BY NUCLEOPHILIC CATALYSIS.

(Eng.) Shapiro, R. *In: Aging, Carcinogenesis, and Radiation Biology. The Role of Nucleic Acid Addition Reactions.* Edited by K. C. Smith. (New York: Plenum Press): pp. 225-242, 1976.

The most significant type of nucleophilic nucleic acid alteration, that of saturation of the 5-6 double bond of cytosine followed by displacement of its amino group, is reviewed. This process causes crosslinking of proteins and nucleic acids and is involved in mutagenesis. Reagents of this type are valuable in the study of the structure and function of nucleic acids. Nucleophilic reagents have not yet been implicated as carcinogens. However, in model studies at the oligonucleotide level, they have been shown to induce conformational transitions similar to those produced by the electrophilic carcinogen, N-acetoxyacetylaminofluorene. An analogous effect was produced as the result of a nucleophilic substitution mechanism. β-Naphthylamine is a potent bladder carcinogen the ultimate reactive metabolite of which has not been established. A number of diribonucleoside monophosphates modified with β-naphthylamine were prepared by bisulfite catalysis. The modified compounds exhibited dramatic alteration in their circular dichroism spectra when compared to the unmodified compounds. These changes resemble those observed in the acetylaminofluorine series. A base displacement effect may be operative in these cases. No such dramatic effects were observed with the phenyl-substituted analogs of the above compounds, or with the other β-naphthyl-modified diribonucleoside monophosphates. It is concluded that it is the specific geometry in an altered compound that determines whether base displacement takes place. The mechanism of attachment of the aromatic residue is irrelevant. Similar conclusions may well apply to the initiation of carcinogenesis on a nucleic acid target. (77 references)

4816 PHOTOCHEMICAL ADDITION OF AMINO ACIDS AND RELATED COMPOUNDS TO NUCLEIC ACID CONSTITUENTS.

(Eng.) Varghese, A. J. *In: Aging, Carcinogenesis, and Radiation Biology. The Role of Nucleic Acid Addition Reactions.* Edited by K. C. Smith. (New York: Plenum Press): pp. 207-223; 1976.

The chemical nature of the addition products of nucleic acid constituents derived from pyrimidine bases with other molecules is described. Pyrimidine bases are very reactive compounds and they form addition products with a variety of compounds under a wide variety of conditions. Additions occur at the C_5 or C_6 positions, which involve activated olefins, ketones and similar compounds, hydroxy compounds, amino compounds, and sulfhydryl compounds. Individua pyrimidine bases may also undergo specific additions such as to the methyl carbon of thymine and to cysteine. There is a need to develop new procedures for the detection of these adducts in biological systems Studies of model compounds suggest that these adduct are unstable with the acid hydrolysis procedures generally used to isolate the photoproducts of nucleic acid constituents from biological systems. Chemical identification of radiation-induced adducts could give valuable information on the arrangement of cell constituents inside a cell. (66 references)

4817 CUTANEOUS PHOTOBIOLOGY: PAST, PRESENT AND FUTURE.

(Eng.) Urbach, F. (Photobiology Program, Skin and Cancer Hosp., Temple Univ. Health Sciences Center, 3322 North Broad St., Philadelphia, PA 19140); Forbes, P. D.; Davies, R. E.; Berger, D. *J Invest Dermatol* 67(1): 209-224; 1976.

The history and origin of the science of photobiology are reviewed. Interest in the biologic effects of light began with the discovery of UV and infrared radiation early in the 19th century. The basis of experimental photobiology was established in the early 1900's by the studies of Raab and Tappeiner on photodynamic action and the early uses of phototherapy by Finsen and Dorno. The discovery of the association of porphyrins with some light-related skin diseases and of the capability of chemical agents such as coal tar and bergamot to induce phototoxic contact dermatitis resulted in a flurry of clinical investigations leading to better understanding of phototoxicity and photoallergy. Early epidemiologic studies relating solar radiation exposure to the formation of actinic keratoses and nonmelanoma skin cancer were experimentally confirmed in animals in the 1930's and 1940's. In the most recent quarter century (1950-1975), cellular and molecular photobiology was refined. Studies on the photochemistry of nucleic acid and of damage and repair mechanisms in DNA have set the stage for understanding the biologic effects of light, and promise the development of useful applications of specifically directed phototherapy and prevention of light-induced diseases such as skin cancer. (141 references)

4818 NUCLEAR ENERGY AND RADIATION HAZARDS. (Dut.) Stortenbeek, A. J. (Interuniversitair Reactor Instituut, Delft, Netherlands); Van Dam, H. *Procestechniek* 31(2): 68-80; 1976.

The effects of radioactivity on humans both qualitatively and quantitatively are reviewed. Included are the dangers of nuclear energy to health, an important aspect since the nuclear contribution to the energy pool in The Netherlands is expected to grow from 2% in 1973 to 25% in 1985. The effects of radioactivity on body tissues and genes are described in dose-effect relationships. Accordingly, projections are made for the increase of background radioactivity and the resulting increase in cancer, which is then compared with fatalities from other causes. It is concluded that the increase in cancer deaths would be insignificant in comparision to other causes of death in The Netherlands. (16 references)

4819 IONIZING RADIATION-INDUCED ATTACHMENT REACTIONS OF NUCLEIC ACIDS AND THEIR COMPONENTS. (Eng.) Myers, L. S., Jr. *In: Aging, Carcinogenesis, and Radiation Biology. The Role of Nucleic Acid Addition Reactions.* Edited by K. C. Smith. (New York: Plenum Press): pp. 261-286; 1976.

Reactions that are initiated by ionizing radiations and that result in the formation of new bonds involving nucleic acids or nucleic acid constituents are described. They include reactions with water, formate, and alcohols; reactions with amines and other small molecules; nucleic acid-nucleic acid reactions; reactions with radiation sensitizers; and attachment reactions in radiation biology. These reactions may differ from those initiated by near-UV radiation because the substances affected by the radiation, the nature of the primary chemical species, and their distribution in the irradiated volume all differ. With ionizing radiations the amount of energy deposition in various molecules depends on their electron fraction, not their absorption spectra, and results in formation of significant yields of electrons separated from their parent molecules, cation radicals, and excited states ranging from the lowest excitation levels to superexcited states. These primary species are distributed along the path of each ionizing particle in small clusters in which the probability of interactions within the clusters is comparable to the probability of escape from the clusters. If escape occurs, reaction may occur at a considerable distance (1-100 nm) from the energy deposition site. Many of the secondary and subsequent reactions started by the cation radicals and electrons involve free radicals similar to those frequently observed following absorption of near-UV radiation. There is a large overlap between ionizing and UV radiation chemistry in spite of the differences. Several lines of evidence suggest that attachments of organic molecules to DNA are likely to occur in living systems exposed to ionizing radiations. (66 references)

4820 MAMMARY TUMOR VIRUS. (Fre.) Vokaer, A. (Hopital Universitaire Brugmann, Universite Libre de Bruxelles, Brussels, Belgium). *J Gynecol Obstet Biol Reprod (Paris)* 4(Suppl. 2): 199-205; 1975.

Experimental evidence has indicated the presence of a type B oncornavirus in the milk of some patients with mammary cancer. This virus has been shown to hybridize with viral RNA from mouse mammary tumor virus (MMTV), which is known to be transmitted through the mother's milk. There is also an antigenic reaction between the serum of some patients with breast tumors and anti-MMTV immunoserum. It is estimated that the milk of 25% of all women contains some viral particles, but the difficulty in getting a clean preparation for examination makes this figure uncertain. However, if this virus could be detected in human milk and breast cancer tissues, it might explain a great deal about human breast cancer. (27 references)

4821 RADIATION TO THE HEAD, NECK, AND UPPER THORAX OF THE YOUNG, AND THYROID NEOPLASIA (Letter to Editor). (Eng.) McConahey, W. M. (No affiliation given); Hayles, A. B. *J Clin Endocr Metab* 42(6): 1182-1183; 1976.

The association between external radiation to the head, neck, and upper thorax of infants, children, and adolescents and the subsequent development of neoplastic changes in the thyroid gland is discussed. Incidence rather than type of neoplastic change appears to be related to the radiation dose. The changes that occur are usually not observed until at least 5 yr after radiation exposure and may be delayed for 30 yr or more. Only a small fraction of those individuals treated with external radiation are likely to develop a significant abnormality of the thyroid, and most of the neoplasms that develop are readily detected and are benign. Less frequently, the neoplasms are papillary and/or follicular adenocarcinomas of low-grade malignancy that grow slowly and can usually be controlled or cured with appropriate treatment. Asymptomatic individuals who have received external radiation treatment during youth should be examined for palpable abnormality of the thyroid gland. If hypothyroidism is present, appropriate replacement therapy should be prescribed. Individuals with firm, discrete nodules in the thyroid or with firm discrete lymph nodes in the lower anterior neck must be considered candidates for surgical treatment. Diffuse and/or lobular enlargement of the thyroid may be due to lymphocytic thyroiditis or multiple adenomas. Appropriate studies to distinguish these lesions include: an evaluation of thyroid hormone serum level, the estimation of antithyroid antibody levels, and a radioisotope scan of the gland. A trial with physiologic thyroid hormone replacement may be of value in some patients; needle biopsy of the gland may also be valuable. (No references)

4822 A SEARCH FOR HERPES SIMPLEX VIRUS TYPE 2 MARKERS IN CERVICAL CARCINOMA. (Eng.) Goldberg, R. J. (Viral Oncology, Div. Cancer Cause and Prevention, NCI, Bethesda, MD 20014); Gravell, M. *Cancer Res* 36(2): 795-799; 1976.

Epidemiological studies of carcinoma of the uterine cervix, the second most common malignant disease of women in the US, were reviewed. These studies provided evidence of an infectious, venereally transmitted disease agent that is involved in a causal or a casual fashion. Cytohistopathological, virological, and seroepidemiological studies confirmed this observation; the agent was identified as herpes simplex type 2 (HSV-2). Defective, noninfectious herpes virions may have greater oncogenicity than fully infectious virions; soluble, nonvirion antigens have been extracted from HSV-2-infected cell cultures, but they have not yet been fully characterized. (73 references)

4823 IN VITRO TRANSLATION OF ADENOVIRUS MESSENGER RNA. (Eng.) Westphal, H. (Natl. Inst. Child Health and Human Development, Natl. Insts. Health, Bethesda, MD 20014). *Curr Top Microbiol Immunol* 73: 125-139; 1976.

Supplementation of the genetic and biochemical studies of tumor virus gene replication by a functional assay of mRNA is discussed. Human adenovirus type 2 is the most commonly used virus in studies concerning adenovirus molecular biology, and the structural and chemical characteristics of this virus are reviewed briefly. Two kinds of cell-free systems have been established with a capability of in vitro RNA translation: crude cell (S30) extracts that contain all the macromolecular components necessary to promote protein synthesis in response to added mRNA, and purified subfractions of the cell's translation apparatus, often derived from more than one source. Many mRNAs have been translated in cell-free systems from a wide spectrum of cell sources. Viral mRNA synthesis begins soon after infection and eventually replaces the synthesis of host RNA. The viral RNAs entering polysomal structures at the various stages of viral development are characterized according to mobility, informational content, and genetic origin. The capability of purified adenovirus mRNA to direct the synthesis of viral polypeptides has been demonstrated in two systems: S30 extracts from ascites tumor cells or wheat germ, and purified ribosomal units and the pH 5 enzyme of ascites cells. In both systems, only mRNA from infected cells gave rise to polypeptides comigrating electrophoretically with adenovirion components. Most or all of the polypeptides in the virion particle, or their respective precursors, are synthesized in vitro in response to this RNA. It is not known whether the proteins are assembled in vitro from the polypeptide elements in a manner analogous to the in vivo process. Polysomes of cells harvested late in infection with adenovirus type 2 contain a distinct size class of adenovirus RNA that appears to originate from different portions of the viral genome. The genetic capacity of the adenovirus genome is more than sufficient to code for all the virus-specific products that have so far been observed in cell-free assays. By in vitro translation of mRNA that have been hybridized with viral DNA, RNA fractions with distinct coding specificities have been obtained. Future areas of research are briefly discussed. (43 references)

4824 HUMAN PUTATIVE ONCOGENIC HERPESVIRUSES. (Eng.) Epstein, M. A. (Dept. Pathology, Univ. Bristol Medical Sch., Univ. Walk, Bristol BS8 1TD, England). *Bibl Haematol* (43): 318-321; 1976.

Evidence relating three human herpesviruses, herpes simplex virus type 1 (HSV-1) and type 2 (HSV-2) and Epstein-Barr virus (EBV), to tumor induction in humans is reviewed. There is currently no definite evidence linking HSV-1 with tumor induction, but some seroepidemiological data have indicated a tenuous association between HSV-2 and carcinoma of the cervix. In vitro animal studies have also shown the ability of HSV-2 to transform normal cells into malignant cells. There is, however, considerable evidence suggesting that EBV is involved in the cause of African Burkitt's lymphoma (BL) and nasopharyngeal carcinoma (NPC); i.e., the presence of high titers of antibodies to the virus in these patients, the presence of the viral genome within the tumor cells, and the presence of viral-determined nuclear antigen. In its relationship to BL and NPC, its transforming ability in vitro, its experimental carcinogenicity in vivo, and its relationships to the cells involved, EBV behaves like the known DNA carcinogenic viruses of animals. However, the evidence for its carcinogenic role in BL and NPC is still indirect and circumstantial, and if EBV does play such a role, it must work with cofactors. Data suggest that in BL there is an interaction of the virus with holoendemic malaria, and in NPC genetic influences may operate along with some environmental cofactors. (36 references)

4825 SEXUALLY TRANSMITTED CANCERS? THE CASE FOR GENITAL HERPES. (Eng.) Aurelian, L. (Johns Hopkins Univ. Sch. Medicine, Baltimore, MD). *J Am Vener Dis Assoc* 2(3): 10-20; 1976.

Coital, marital, and parity factors have been identified as playing a role in the etiology of squamous cancer of the human uterine cervix, suggesting this neoplasia may be infectious in origin and venereally transmitted. The evidence associating this neoplasia with a venereally transmitted virus, herpesvirus type 2 (HSV-2), is critically reviewed. Biologic studies of transmission, as well as in vitro analyse of the predictions required by the biology of the virus provide evidence in support of the herpesvirus hypothesis, visualizing HSV-2 as the causative factor. They indicate that cervical tumor cells harbor at least a fragment of the viral genome, messenger RNA, and some viral proteins. They further provide evidence for the presence of the tumor specific antigen AG-4 in all tumor samples studied and show that AG-4 is a virion structural polypeptide located also on the surface of 2% to 5% of the infected cells. These observations as well as the immunodiagnostic nature of AG-4 provide evidence for the direct role of HSV-2 in active tumor growth and suggest a possible mechanism for HSV-2 induced oncogenesis. Nevertheless, even if HSV-2 causes cervical cancer, it cannot do so alone, as a relatively high proportion of women with HSV-2 infections do not develop cervical cancer. (64 references)

4826 HOST RESPONSES TO HERPESVIRUSES--A REVIEW. (Eng.) Henle, W.; Henle, G. *In: Oncogenesis and Herpesviruses II. Part 2: Epidemiology, Host Response and Control. Proceedings of a Symposium held in Nuremburg, Federal Republic of Germany, 14-16 October 1974.* International Agency for Res. on Cancer. (Lyon, France): pp. 215-224; 1975.

A primary infection with Epstein-Barr virus (EBV) leads to a carrier state in which a stable equilibrium develops. This equilibrium may be upset by a variety of malignant diseases, resulting in high titers of antibodies to EBV, which may be accounted for by the immunosuppressive effects of the malignancies. By monitoring of this level, the progress of therapy can be followed and the prognosis updated. Since the transformed cells never completely leave the system, periodic monitoring is suggested. (48 references)

4827 HUMAN PAPOVAVIRUSES: CURRENT KNOWLEDGE ON THEIR BIOLOGIC AND ONCOGENIC PROPERTIES. (Eng.) Takemoto, K. K. (Lab. Viral Diseases, Natl. Inst. Allergy and Infectious Diseases, Bethesda, MD 20014). *Bibl Haematol* (43): 565-568; 1976.

Two papovavirus variants of simian virus 40 (SV40) have recently been isolated from humans, one (BKV) from the urine of immunosuppressed patients after renal transplants or of patients with immunodeficiency disease, and another (JCV) from the brain tissues of patients with progressive multifocal leukoencephalopathy. The biological and oncogenic properties of these two viruses are reviewed. Both agglutinate human type O RBC at 4 C, and both have a narrow, restricted host range. They are widespread and ubiquitous in humans; approximately 70%-80% of adults have antibodies to them. They share cross-reacting viral antigens, not only between each other, but also with SV40; all three viruses also induce nonvirion T antigens. Although JCV and BKV are oncogenic for hamsters, they differ in their tumor-producing capacity: the former is highly oncogenic and the latter is weakly oncogenic. BKV and supercoiled DNA from BKV can transform hamster cells in culture. Studies of DNA from BKV are relatively more numerous than those of DNA from JCV. Approximately 10%-20% polynucleotide sequence homology between BKV and SV40 is reported, and studies of JCV DNA indicate a 10%-20% relatedness to BKV and SV40. Since these viruses persist or are latent in various organs and are also oncogenic for animals, they should be considered potential cancer-inducing agents in humans. (26 references)

4828 BIOLOGICAL CONSIDERATIONS OF TUMOR-SPECIFIC AND VIRUS ASSOCIATED ANTIGENS OF HUMAN BREAST CANCERS. (Eng.) Black, M. M. (New York Medical Coll., Flower and Fifth Ave. Hosps., New York, NY 10029); Zachrau, R. E.; Shore, B.; Leis, H. P. *Cancer Res* 36(2): 769-774; 1976.

The nonrandom development of human breast carcinomas, the characteristics of preinvasive breast cancers, and the heterogeneous behavior of invasive breast carcinomas, especially with regard to tumor-host interactions, were considered to support the individuality of patients and their lesions. This is in contrast to the practice of referring to breast cancer as if to a homogeneous, single entity. In vivo and in vitro studies were reviewed; they revealed that in situ carcinomas precede invasive carcinomas. Microscopically demonstrable lymphoreticuloendothelial responses, skin window tests, and leukocyte migration tests all indicated that tumor-specific antigenicity develops in the early phases of mammary carcinogenesis. This antigenicity is expressed maximally in in situ carcinomas without associated invasive breast cancer and minimally in invasive breast cancer with metastases. Immunogenic breast cancer tissues commonly contain a protein component with antigenic and physicochemical properties that are similar to those of a protein component of murine mammary tumor virus. It was concluded that immunological phenomena play a role in the behavior of breast cancer in individual patients. Immunoprophylaxis appears attainable, except in patients who have already had the invasive disease. The necessity of individualization of treatment, not only in immunotherapy but in chemotherapy and radiotherapy as well, was stressed. (30 references)

4829 CELL SURFACE ANTIGENS ASSOCIATED WITH CELL DIFFERENTIATION. (Eng.) Artzt, K.; Bennett, D. *In: Cell Surfaces and Malignancy. John E. Fogarty International Center for Advanced Study in the Health Sciences and NIH.* Mora, P. T., ed. [Washington, DC: US Dept. Health, Education, and Welfare Publication No. (NIH) 75-796]: Fogarty International Center Proceedings No. 24, pp. 179-189; 1975.

It is suggested that differential gene action may be initiated by the position of cells of the early embryo relative to one another and to the inside or outside of the embryo. Several experiments that support this view are briefly reviewed. The T-locus in the mouse and a series of mutant alleles at the T-locus are described. Each of these mutants, when homozygous, produces a characteristic failure in differentiation and affects the production and/or function of sperm. Cytotoxicity tests have shown that the mutant T produces an abnormal cell surface component that is detectable on sperm but not present on other adult cells. In a study of cell surface antigens of early embryonic cells, syngeneic 129 mice were hyperimmunized with a restricted primitive teratocarcinoma (PTC) cell line (F9). The mice produced antibody specifically cytotoxic for PTC-F9 cells and other PTC cell lines but not for differentiated teratoma cell lines derived from the same original tumor. The anti-PTC antisera were negative for all other mouse cells tested except morula cells and spermatozoa. An experiment was conducted to determine if the antigen could be specified by the wild-type (+) of a particular t-lethal (t^{12}). It was hypothesized that sperm from $+/t^{12}$ males should be only half as effective as normal +/+ sperm in absorption of anti-F9 serum. The data show that the major antibody component of F-9 serum is directed against the +/+ sperm. It is concluded that antigens specified by T-locus genes are expressed in cells of normal embryos and in tumors of appropriate origin and developmental stage. (44 references)

4830 CURRENT QUESTIONS ON THE TUMOUR-ASSOCIATED ANTIGENS OF CHEMICALLY-INDUCED TUMOURS. II. IN SEARCH OF PRACTICAL USES. (Eng.) Oth, D. (I.N.S.E.R.M. Res. Unit U 95, Plateau de Brabois, 54500 Vandoeuver, France). *Biomedicine* 24(1): 4-10; 1976.

Possible practical applications of findings concerning tumor-associated antigens (TAA) in chemically induced tumors (CIT) in immunoprophylaxis and immunotherapy are discussed. A number of researchers have found a reduction in the induction of tumors by 2-anthrylamine or methylcholanthrene by pretreatment with a carcinogen-protein conjugate or with radiation leukemia, respectively. An important step in immunotherapy has been the demonstration that the host of a primary CIT is able to develop an immune response against the TAA despite the immunodepressive action of the carcinogen. Regular tissue-type-specific cross-reactions have been observed between TAA in some chemically induced bladder tumors of mice and rats and colonic tumors of rats. This model seems to be of value for the study of TAA in some human tumors of the same origin.

4831 THE CELL SURFACE-MEMBRANE COMPLEX IN CELL INTERACTIONS. (Eng.) Edleman, G. M.; Wang, J. L. *In: Cell Surfaces and Malignancy. John E. Fogarty International Center for Advanced Study in the Health Sciences and NIH.* Mora, P. T., ed. [Washington, DC: US Dept. Health, Education, and Welfare Publication No. (NIH) 75-796]: Fogarty International Center Proceedings No. 24, pp. 83-116; 1975.

Cell-cell interactions and cell surface signaling depend on the physicochemical interactions of receptors, the specificity of these receptors, and their linkage to metabolic events within the cell. Experiments on patching and capping of lymphocyte surface receptors and the modulation of receptor and cell movements by lectins such as concanavalin A (Con A) and various drugs suggest that cell surface receptors may have a common anchorage system under the plasma membrane. It is proposed that this system involves reversible and cooperative interactions in an assembly consisting of receptors, microfilaments, microtubules, and their subunits. The structural homology of β_2-microglobulin (cell surface protein) with immunoglobulins and the physical association of this protein with histocompatibility antigens suggest the possibility that specific cell-cell recognition in development may be mediated by a diverse and degenerate set of receptors. Analyses of the kinetics of lymphocyte response to stimulation by Con A suggest that resting cells not only have a diverse set of receptors for cell-cell interactions, but also exist in a temporally dispersed and statistically distributed set of responsive states in the G_1 portion of the cell cycle. This set of temporally dispersed states may themselves form a cycle. Although the modulation, diversity, and temporal dispersion hypotheses are derived largely from lymphocyte studies, they may apply to other differentiated cells as well. (54 references)

4832 MOSAIC (CHIMERIC) ANIMALS: THEIR EXPERIMENTAL PRODUCTION AND APPLICATION. (Ger.) Elbling, L. (Institut fuer Krebsforschung, Universita Wien, Borschkegasse 8a, A-1090 Vienna, Austria). *Wien Klin Wochenschr* 88(9): 302-305; 1976.

A modified Tarkowski method for the mosaic-type fusion of mouse embryonic cells of different genetic composition is described. Clonal growth in mammalian embryos, problems in myogenesis, sex differentiation in gonosomal mosaics, and the role of the genotype in tumorigenesis are also reviewed. The apparent immunological tolerance in chimeras is traceable to serum blocking factors (antibody or antigen-antibody complexes). It is probable that a blockade of cytotoxic lymphocytes is responsible for deficient in vivo immune reactions in chimeras. (37 references)

4833 CANCER AND IMMUNODEFICIENCY DISEASES. (Eng.) Kirkpatrick, C. H. (No affiliation given). *Birth Defects* 12(1): 61-78; 1976.

The interrelationships between the immune system and neoplasia are discussed. The development of the immune system and its relationship to the pathogenesis of immune deficiency syndromes are described. Defects in the immune system involving B and T lymphocytes are briefly reviewed. Information has been collected and tabulated on the histologic type and location of cancers in immunodeficient patients. Of the 151 tumors reported, 58% involved the lymphoreticular system. These neoplasms accounted for the majority of cancers in patients with isolated IgM deficiency, the Wiskott-Aldrich syndrome, ataxia-telangiectasia, common variable hypogammaglobulinem and SCID (combined immunodeficiency). Lymphomas were responsible for 69% of the cancer deaths in immunodeficient patients, but only 8% in a control group. It was found that certain malignancies occur more frequently in association with certain immunodeficiencies. Five disorders in which the serum IgM levels were abnormal were associated with lymphoreticular neoplasms. Epithelial tumors were the most frequently observed types in patients with isolated IgA deficiency. Patients with Wiskott-Aldrich syndrome develop a poorly differentiated reticuloendotheliosis, often involving the brain.

The occurrence of cancer in recipients of immunosuppressive or cytotoxic drugs is briefly reviewed. In 6,297 renal transplant patients, the risk of lymphoma was 2.2/1,000/yr, or 30-40 times the expected value. The risk of reticulum cell sarcoma was 350 times that expected in the control group. In 10 of 47 incidents in which organs were transplanted from cancer-bearing donors to apparently cancer-free recipients, the tumor spread to distant sites and was the cause of death in seven cases. In the remaining patients, the immunosuppressive therapy was stopped and the tumors disappeared. It is believed that susceptibility to malignancy involves immunologic functions that inactivate oncogenic agents or toxins or destroy transformed cells. (87 references)

4834 IMMUNOLOGICAL STUDIES OF HUMAN COLONIC TUMORS. (Fre.) Burtin, P. (Institut de Recherches sur le Cancer, B.P. no. 8, F 94800 Villejuif, France). *Bull Cancer (Paris)* 62(4): 431-438; 1975.

Immunological studies of human colonic tumors are reviewed in terms of their methodology, immunochemistry or cellular immunology. Immunochemical studies have yet to reveal a cancer-specific antigen for colonic tumors. Carcinoembryonic antigen, associated with the apical pole of glandular cells and having a molecular wt of 180,000 was found in relatively large amounts in well-differentiated colonic carcinomas and in traces in noncancerous colonic mucosa. Radioimmunoassay indicated a level of >2.5 ng/ml not only in the sera of most digestive cancer patients but also in some patients with nondigestive cancer or inflammatory disease. Moreover, CEA increase is noted in only one-third of incipient colonic carcinomas. Therefore, CEA is not reliable for diagnosing colon cancers, especially the localized ones. However, this assay is valuable in the postoperative followup of colonic cancer patients. Cellular immunology studies indicate that inhibition of blood leukocyte migration and lymphoblastic transformation provide more reliable information on lymphocyte reactivity in colonic cancer than microcytotoxicity tests. The same is true with skin tests made in cancerous patients with extracts of their own tumor. (16 references)

4835 IMMUNE REJECTION. (Fre.) Fauve, R. M. (Departement de Biologie moleculaire, Institut Pasteur, 25, rue du Docteur-Roux, 75015 Paris, France). *C R Acad Sci [D] (Paris)* 282(12): 1207-1209; 1976.

The capacity to suppress effectors of the immune reaction locally may explain why some aggressors settle and proliferate in host tissues. Highly malignant cancer cells can invade tissues and settle in them without causing inflammation. Some researchers have noted a decrease of vascular permeability in tumors. Others connect the lack of inflammation to the degree of malignancy or find an inverse correlation between malignancy and macrophage level. In vitro, macrophages in contact with tumor cells are unable to adhere to them and partially lose their spreading power. Inflammation is also absent from some parasitic diseases. In one experiment, the sc introduction of 25 live adult worms (*Schistosoma mansoni*) into mice did not cause any reaction. By contrast, the introduction of 25 worms killed by glutaraldehyde resulted in swelling and granuloma. This led to the supposition that live worms released anti-inflammatory substances. Fifty live worms were incubated in a solution containing 1% cow albumin serum. Six hours later, the top layer was filtered and injected ip in mice. Another 6 hr later, the inflammatory reaction was measured by the percentage of polynuclear cells in the rinsing liquid of peritoneal cavities. This percentage was below 20% in the treated mice. In a control group, it exceeded 50%. Certain virulent bacteria have produced the same effects. The injection in mice of nonvirulent *Staphyllococcus aureus* results in exudation and leucocyte infiltration. After the injection of virulent *S. aureus*, there was no edema or infiltration. A substance responsible for this effect has been isolated. To conclude, mechanisms of immune rejection may inhibit immune reactions locally through immunorepulsive substances produced by various aggressors. The immune rejection results in a local immunodepression. (23 references)

4836 INVESTIGATION INTO THE PROBLEM OF INTERRELATION OF LEUKEMIAS IN MAN AND ANIMALS. (Rus.) Khokhlova, M. P. (Central Inst. Hematology and Blood Transfusion, USSR Ministry Public Health, Moscow, USSR). *Sov Med* (9): 64-69; 1975.
1975.

The question of human exposure to animal leukemias is raised. In certain areas, e.g., the Soviet Baltic states, there is a regional correlation ($p > 0.1$) between the levels of human and bovine mortality from leukemias and other hemoblastoses, including lymphomas. The areas involved are rural and the animals are horned cattle. There was no particular correlation, supported by the literature, between human morbidity, including workers in various aspects of the food industry, and exposure to affected animals. A literature review of the relation between leukemic diseases in domesticated dogs and cats and humans found no unequivocal correlation. The opinion that human, especially adult, contact with leukemic animals is only weakly pathogenic is supported by experimental studies of alleged viral transmission. The suspicion of a relationship between chronic or acute leukemias in children and regions of high enzootic leukemic morbidity remains to be explored further. (16 references)

4837 GEOGRAPHICAL DISTRIBUTION OF LEUKEMIAS AND HEMATOSARCOMAS. (Fre.) Bernard, J. (Clinique des Maladies du Sang, Hopital Saint-Louis, 2, place du Docteur Fournier, 75010 Paris, France). *Biomedicine* 24(2): 81-83; 1976.

The geographical distribution of leukemias, lymphomas, and hematosarcomas is reviewed, and factors accounting for differences in distribution are considered. The relationship of Burkitt's lymphoma to the tropical conditions of humidity and temperature is well-known. Heavy-alpha-chain disease appears to be related to intestinal lymphomas of the Mediterranean area. The frequency and type of leukemia vary according to country, region, and season, and the rarity of chronic lymphoid leukemia in Japan is an example. Epidemiology of hematosarcomas and lymphomas is less well-established. In contrast to leukemias, which appear more frequently in temperate zones, lymphomas have a higher incidence in the equatorial regions of the world. The relationship of animal leukemias such as bovine and porcine to human leukemias is considered. Many factors other than temporal or spatial, such as genetic, diet, drugs, availability of hematological services, etc., may account for variations in the geographical distribution of leukemias and hematosarcomas. (17 references)

4838 SOME ASPECTS OF THE PROBLEM OF CANCER IN INDONESIA.

(Eng.) Pringgoutomo, S. (Natl. Inst. Cancer Res., Salemba 6, Jakarta, Indonesia). *GANN Monogr Cancer Res* (18): 247-251; 1976.

A pattern of the relative site incidence of malignant tumors in Indonesia is presented. Before 1945, the more common cancers were those of the liver, mouth, skin, and lymph nodes; stomach cancer was rare. From 1945 to 1965, the most frequent form was cervical cancer; other commonly seen cancers were those of the skin, penis, and nasopharynx. Data collected during the last 5-10 yr showed that of the 10 most frequently found cancers, cervical and breast cancer ranked first in women, cancer of the lymph nodes and lymphoid tissue ranked first in men, and skin cancer was the most common malignancy in both sexes. The incidence of nasopharyngeal and gastrointestinal cancers was also notable. The pattern of skin cancer in Jakarta was similar to that seen between 1945 and 1965: the most common sites were the head and neck, followed by the lower limb. A concentrated epidemiological study has not yet been performed, but a regional and central cancer registry has been established so that reliable data can be collected, and a public education campaign has been organized to encourage people to seek medical care for cancer. (12 references)

4839 CANCER CONTROL IN THE PHILIPPINES: PROBLEMS AND APPROACHES.

(Eng.) Basa, G. F. (Philippine Cancer Society, Inc., San Rafael 310, San Miquel, Manila, Philippines); Cruz-Basa, A. G. *GANN Monogr Cancer Res* (18): 287-297; 1976.

Some of the problems of cancer control in the Philippines are reviewed, and some current approaches to the problem are outlined. Since the life expectancy in this country continues to increase, a corresponding rise in chronic degenerative and neoplastic diseases may be anticipated. From 1953 to 1968, death from cancer rose from tenth to seventh place among the leading causes of death in the Philippines. From 1965 to 1970, the average 5-yr incidence of death from cancer was 23.5/100,000, constituting 3.3% of all deaths in the period. In 1970, the corresponding values were 25.7/100,000 and 3.8% of all deaths. Many factors contribute to underreporting of cancer deaths: geographic barriers, linguistic diversities, communication problems, insufficient medical manpower, and deficient facilities. None of the 99 hospitals in the Greater Manila area, including 19 specialty hospitals, specialize in the care of cancer patients. In the outlying areas, some cancer cases are not discovered until death. The anticancer program of the National Health Plan calls for a role in this program for government, the private sector, and sociocivic and professional organizations. Government agencies are to be involved in the formulation of general policies and in the coordination of activities with the private sector. Specific research and therapeutic programs are to be implemented, as are support and training programs. The government will also collect and analyze statistical data. The privat sector is to be involved with professional training, collaboration in epidemiological and clinical research, and the participation of medical centers in the National Health Program. The Philippine Cancer Society and the Philippine Medical and Specialty Societies will support lay and professional education, extend professional specialty services to rural regions, and provide funds for research. The importance of more accurate knowledge of the magnitude of the cancer problem in a developing nation such as the Philippines is stressed. (10 references)

4840 PECULIARITIES IN THE DISTRIBUTION OF CANCER AS CLUES TO ITS ORIGINS: HOST FACTORS.

(Eng.) Miller, R. (No affliliation given). *Birth Defects* 12(1): 1-5; 1976.

The distribution of cancer by age, sex, and race has suggested a prenatal, age-related fault in the immunological system and a genetic etiology for different cancers. In US white children, there are marked peaks of cancer mortality within the first 5 yr of life due to eight neoplasms, which suggests a prenatal influence. As Ewing tumor is almost absent in U.S. blacks and as this group does not show the peak mortality from acute lymphocytic leukemia that U.S. whites show, a genetic etiology is suggested. International differences in childhood neoplasia have confirmed the very high frequency of pinealoma in Japanese children. Wilms' tumor is the most constant, on an international level, of all neoplasms. A progressive change in the rates for neuroblastoma and Hodgkin's disease across Europe, plus a migrant effect seen in blacks, suggest an environmental cause for these conditions. Familial and multiple primary cancers can also be seen. Soft tissue tumors in sibs during childhood have been found in multiple families in which other cancers, especially cancer of the breast in young females, affect close relatives. Glioma, adrenal cortical carcinoma, and osteosarcoma have been observed in first degree relatives. Elements of syndromes involving cancerous and noncancerous disease may also be spread through the family. A relationship between cancer and congenital malformations has also been noted. Chromosomal abnormalities such as Down's syndrome may be present in groups at a high risk for leukemia, and inborn immu deficiency states may predispose patients to lymphom Sporadic congenital aniridia has been associated with Wilms' tumor and with manifestations of growth excess. (21 references)

4841 COMPARATIVE INTERNATIONAL INCIDENCE AND MORTALITY. (Eng.) Correa, P.; Haenszel, W.

In: Cancer Epidemiology and Prevention: Current Concepts. Edited by D. Schottenfeld. (Springfield: Charles C. Thomas): pp. 386-403; 1975.

Analysis of information concerning anatomical localization of tumors, sex- and age-patterns in incidence, time trends, migrant population experience, and studies of precursor lesions led to a tentative epidemiological model for cancer of the colon and rectum. The data showed that there are low male-female ratios for tumors above the sigmoid flexure in certain low-risk populations and male-female ratios close to unity in high-risk populations. There is a rise in sigmoid/cecum ratios, steeper for males than for females, from low- to high-risk populations. Observations of migrant populations, particularly Japanese migrants in Hawaii, corroborated other data suggesting an environmental agent(s) in the development of this cancer. To account for these and other findings, the following model was proposed. In low-risk populations where the disease is endemic, cancers are concentrated in the cecum and ascending colon, female cases are more common, and most of the rise to maximum incidence occurs by ages 50-55. With the introduction of a new etiological factor, the transition from an endemic to an epidemic phase is first expressed as a rise in sigmoid cancers among men over 55 yr. A rise in female sigmoid cancer follows later. As exposures to the etiological factor become more intense, there is a rise in cecum and ascending colon cancers that is more marked for males than females. The unifying idea in the model is the greater volatility in male response to changed conditions. Rather than ascribing this to sex differences in exposures within a new environment, a more fundamental biological explanation should be sought. Further study of the relationship between suspect precursor lesions, such as adenomatous polyps, and the high risk of colon cancer is encouraged. (22 references)

4842 EPIDEMIOLOGY OF INTESTINAL AND RECTAL MALIGNANT NEOPLASMS. (Pol.) Staszewski, J.

(Instytut Onkologii 44-101 Gliwice, ul. Wybrzeze Armii Czerwonej 15, Poland). *Nowotwory* 26(1): 9-14; 1976.

The worldwide incidence of malignant neoplasms of the intestine and rectum is discussed and their appearance with socioeconomic and other factors is correlated. The incidence is high in northwestern Europe and among Anglo-Saxons and low in eastern central Europe, South America (with the exception of Argentina and Uruguay), Asia, and Africa. In Poland in 1970, intestinal and rectal malignant neoplasms constituted approximately 7% of the total and caused 7% of deaths from neoplasms; the corresponding figures in the United States in 1969 were 15% and 14%. Although no correlation has been found between these neoplasms and socioeconomic class, a higher level of national development is generally associated with a greater incidence (with the exception of Japan). Particularly interesting changes in their frequency have been noted among migrants traveling between regions with different incidence rates. For instance, although Polish emigrants came to the United States from agricultural regions with relatively low incidence rates compared with Poland as a whole, their mortality rates were the same as those of native Americans, and, thus, significantly higher than in Poland. Similar observations were made for Polish emigrants to Australia and Japanese emigrants to the United States. Data on causative factors, although fragmentary, implicate nutrition and diet in particular. (26 references)

4843 EPIDEMIOLOGY OF COLORECTAL CANCER. (Fre.) MacLennan, R.

(Centre International de Recherche sur le Cancer, 150, cours Albert- Thomas, 69008 Lyon, France). *Bull Cancer (Paris)* 62(4): 411-418; 1975.

Recent epidemiological studies, reviewed here, show that industrialization by itself is not a factor in colorectal cancer. Geographical variations and changes in migrants indicate that dietary factors may have an important effect. High dietary animal fat is believed to stimulate increased biliary secretions and thus provide a substrate for bacterial conversion to carcinogens and cocarcinogens. The association of beef consumption with colorectal cancer may be due to the fat content of beef relative to other meats. Another finding was that, internationally, the consumption of beer is linked more often to cancer of the rectum that to cancer of the colon. The hypothesis that a deficiency in dietary fiber is involved in colorectal cancer has little supportive evidence. (18 references)

4844 EARLY PHASE OF DEVELOPMENT OF HUMAN GASTRIC CANCER. (Eng.) Oota, K.

(Dept. Pathology, Tokyo Metropolitan Inst. Gerontology, Sakaecho 35-2, Itabashi-ku, Tokyo 173, Japan). *GANN Monogr Cancer Res* (18): 77-83; 1976.

A nationwide registration system was established in Japan to follow each treated case of gastric cancer, the cause of 50% and 30% of all deaths from malignancies in men and women, respectively. These data were used to improve diagnostic and therapeutic techniques. An endoscopic followup of gastric lesions revealed a most significant finding in the pathology of this cancer: a process of successive regression, regrowth, and ulceration can occur until a carcinoma develops. Thus, some carcinomas can grow slowly initially and remain in superficial layers, some can be reduced in size by partial shedding of the infiltrated area, and in some focal healing can occur. Such a malignant cycle can occur repeatedly if the malignant infiltration and the ulcerative process are superficial. Polyps have been implicated in the histogenesis of carcinoma of the large bowel, but malignant degeneration of hyperplastic polyps of the stomach is rare. Another possibly malignant lesion, the particular flower-bedlike elevation of the gastric mucosa, is said to be an adenoma. Gastric carcinomas have been classified into two types, intestinal and diffuse, but the hypothesis that there are actually two different kinds of carcinoma of the stomach with different causes and histogenesis is not supported. (19 references)

4845 THE REGULATION OF POLYMORPHONUCLEAR GRANULOPOIESIS. (Fre.) Hollard, D. (Service d'Hematologie du CHU de Grenoble, rue des Martyrs, 38700 Grenoble, France); Berthier, R.; Douady, F. *Sem Hop Paris* 51(10): 643-651; 1975.

Laboratory animals and normal and leukemic human granular cells have been used to study the granular differentiation of the hemocytoblast. These studies, supplemented with in vivo kinetic studies, suggest the following pattern of development. Neutrophil granulocytes appear to be derived from a hemocytoblast identical to that of the other blood cells. This totipotent cell is differentiated by its ability to form clones of multiple composition in vivo. The way in which the clone-forming cell evolves toward granulopoiesis in vivo depends on a genetic factor, phenomena of derepression, and an extrinsic factor that is probably cellular. The differentiation of this cell leads to a fixed density clone-forming cell in in vitro. In vivo, a myeloid and macrophage clone-stimulating factor intervenes to insure granulopoiesis. Various forms of this stimulating factor and an inhibitor intervene (in vitro) to regulate granulopoiesis. Further studies will increase our understanding of this and associated leukemic processes. (35 references)

4846 ADENOMYOMATA OF THE APPENDIX AND URETHRA. THE PROBLEM OF THE INDUCTION OF STROMA INTO FOCI OF ENDOMETRIOSIS. (Fre.) Van Bogaert, L. J. (Laboratoire de Pathologie et Cytologie Tumorale, Universite Catholique, Capucienenvoer 35, 3000 Louvain, Belgium); Maldague, P. *J Gynecol Obstet Biol Reprod (Paris)* 5(1): 15-24; 1976.

Three theories for the appearance of endometriosis are presented: the transmission of endometrial fragments through the oviducts into the peritoneal cavity; a hormonal or inflammatory induction of the differentiation of mesodermal tissue into mullerian tissue; and the transfer of endometrial cells that still have the ability to differentiate to susceptible tissues. It is believed that the last theory, which explains many genital lesions, can also explain adenomyomata of the appendix, urethra, and ligaments. Nonmullerian organs apparently need ectopic endometrial glands to induce endometriosis in the surrounding stroma; however, mullerian organs do not. (19 references)

4847 CONGENITAL AND GENETIC SKIN DISORDERS WITH TUMOR FORMATION. (Eng.) Reed, W. B. (Dept. Dermatology, Univ. California, Irvine, CA). *Aust J Dermatol* 16(3): 95-108; 1975.

The association of congenital and genetic skin disorders with tumor formation is reviewed. The internal hamartomas considered are tuberous sclerosis, neurofibromatosis, the mucosal neuroma syndrome of Williams and Sipple, the nevoid basal cell carcinoma syndrome, the Peutz-Jeghers syndrome, the Gardner syndrome, the blue rubber-bleb nevus, and the Cowden disease. The heredodegenerative disorders included are ataxia-telangiectasia, the Wiskott-Aldrich syndrome, the Chediak-Higashi syndrome, the Werner syndrome, xeroderma pigmentosum:DeSanctis-Cacchione syndrome, the Bloom syndrome, the Rothmund-Thomson syndrome, dyskeratosis congenita, Fanconi anemia, myotonia dystrophica, and total oculocutaneous albinism. Congenital abnormalities discussed include nevus sebaceous, giant pigmented nevus and the nevus of Ota, and the Maffucci syndrome. Other categories of disorders considered include the ectodermal-dermal defects, cutaneous hamartomas, and the chromosomal disorders (the Down, Turner, Klinefelter, and depletion syndromes). (6 references)

4848 ON THE DEVELOPMENT, BEHAVIOR AND THERAPY OF THE ADENOMATOUS HYPERPLASIAS OF THE ENDOMETRIUM AND ENDOCERVIX. (Ger.) Dallenbach-Hellweg, G. (Univ.-Frauenklinik, Theodor Kutzer-Ufer, 68 Mannheim 1, West Germany). *Fortschr Med* 94(5): 256-263; 1976.

Various factors associated with endometrial and cervical hyperplasia are discussed. Glandular hyperplasia of the endometrium is attributed to a prolonged surfeit of estrogen. This can occur endogenously either by follicle persistence (premenopausal polycystic ovaries), ectopic formation (postmenopausal), depot accumulation due to inadequate breakdown, or the absence of progesterone. Glandular, or adenomatous, hyperplasia involves the authentic formation of new glandular tissue, with gradual erosion of the stroma. Cystic-glandular hyperplasia (Swiss-cheese endometrium) involves proliferation of, and cystic spread in, already preformed glands. Most premenopausal hyperplasia is of an exogenous origin. Although premenopausal adenomas can be multicentric, they are usually focal for protracted periods because of their insensitivity to gestagenic hormones. Multicentric involvement in postmenopausal endometria is diffuse, with many foam cells storing estrogen metabolites. (8 references)

4849 PATHOLOGICAL ANATOMY AND ETIOLOGY OF CARCINOMAS OF THE URINARY BLADDER. (Ger.) Schubert, G. E. (Pathologisches Institut der Universitaet, 74 Tuebingen, Liebermiesterstr. 8, West Germany). *Dtsch Med Wochenschr* 101(1): 24-26; 1976.

The pathological anatomy of bladder carcinoma is discussed relative to a recent WHO classification. Evidence that urinary tract carcinogenesis is a function of the urine-epithelial cell interface has an anatomical basis. The ureteral orifice is the preferential site of bladder carcinoma, there is a high incidence (50%) of bladder carcinoma concomitan to renal pelvic tumors, and 8% of all patients cyste tomized for bladder carcinoma also have preinvasive ureteral carcinoma. Papillomas are frequent concomitants, occurring mainly between 60 or 70 yr of age. Based on animal experimentation, even highly differe tiated papillomas without anaplastic change should be considered grade I transitional cell carcinomas. Inverted and squamous epithelial types are rare, bu must be regarded as potentially malignant. Occupational exposure to exogenous agents, particularly aromatic amines, accounts for only 10%-20% of urinary tract malignancy. Carcinogenic metabolites of routine food or drug ingestion are implicated in the remainder. Since 20% of all bladder carcinomas present with one or more additional primary tumors in the colon, rectum, anus, breast, or skin, host tumor disposition must also be critical. (24 references)

4850 THE ULTRASTRUCTURAL MORPHOLOGY OF GYNECOLOGIC NEOPLASMS. (Eng.) Ferenczy, A.

(Jewish General Hosp., Montreal, Quebec H3T 1 E 2, Canada). *Cancer [Suppl]* 38(1): 463-486; 1976.

A series of malignant or potentially malignant genital neoplasms for which electron microscopy has brought about a significant breakthrough in their diagnosis and histogenesis are reviewed. The presence of well-developed junctional complexes, such as desmosomes, zonula occludens, and zonula adherences, between neoplastic cells distinguishes carcinomas from sarcomas. The formation of bundles of tonofilaments and tonofilament-desmosome junctional complexes is a characteristic feature of squamous cell carcinoma of the cervix, whereas the formation of glandular lumina and mucin-containing secretory granules is a cellular specialization of mucinous adenocarcinoma of the endocervix. The distinguishing characteristics found by electron microscopy are given for adenocarcinomas of endometrial origin, endometrial carcinomas of the ovary, low-grade mucinous cystadenocarcinomas, frank mucinous carcinomas of the ovary, Sertoli-Leydig cell tumors, dysgerminomas, endometrial stromal cell carcinomas, and leiomyosarcomas. A discussion of the regressive morphologic changes produced by exogenous progestins and their relation to endometrial hyperplasia and carcinoma is included. (53 references)

4851 CURRENT VIEWS ON BREAST CANCER (I). (Spa.) Estape, J. (No affiliation given). *Med Clin* 63(7): 366-370; 1974.

The current knowledge of the epidemiology of breast cancer is reviewed. Incidence rates have increased and mortality rates have decreased in the last 30-40 yr. Some controversial statistics reported in the literature are mentioned. The mortality versus age relationship indicated that breast cancer is the main cause of death in women 30-40 yr of age. Previous cancer in one breast or a familial history of cancer are the highest risk factors. High fat diet, obesity, and disturbances in carbohydrate metabolism are mentioned among the metabolic factors. Genetic studies indicate a higher incidence of breast cancer in patients with antigenic determinant A in the ABO blood group system. A possible viral etiology of breast cancer in humans is still under investigation without conclusive results. New viral particles, defined as MS-1, MS-2 and MS-3, detected in humans have characteristics similar to those of the B particles in mammary carcinoma virus of the rat. Women from the Parsi tribe of India, with high incidence of breast cancer, had more viral particles in their milk than American women with or without familial risk of breast cancer. Viral particles similar to those found in rats with breast cancer were discovered in an 8-yr-old *Maccacus Rhesus* with a spontaneous breast tumor. Cellular type immunological reactions are sometimes observed in women with breast cancer, more frequently in Stage 1 patients than in Stage 2 patients; these responses are similar to those detected in experimental breast tumors. The hormone factors, mainly ovarian estrogens, are held responsible for the development of breast cancer in one-third of the cases. No conclusive evidence exists that contraceptive compounds are carcinogenic. (44 references)

4852 PATHOLOGY OF BREAST CARCINOMA. (Ger.) Grundmann, E. (Pathologisches Institut,

Universitaet Muenster, D-440 Muenster/Westf., Westring 17, West Germany); Nienhaus, H. *Chirurg* 46(12): 533-540; 1975.

The epidemiology, pathogenesis, histology, cytodiagnosis, early recognition, incidence, risk factors, and prognosis of mammary carcinoma are reviewed. The cocarcinogenicity of ovarian and pituitary hormones with known chemical carcinogens, with a subsequent reduction in tumor latency time, applies to about 30% of breast carcinomas in both sexes. Hormonal management of gynecological problems is therefore as great a risk factor as a positive congenital history or atypical precursor mammary conditions. Moreover, the apparent absence of free viral particles in breast cancer is no argument against viral etiology. Parallels between the development of mammary carcinoma and the various life-cycle phases of epithelial proliferation and resorption are described. Mastopathies with atypical epithelial hyperplasia (polymorphism, hyperchromasia, atypical mitoses), such as intra-acinar and intrapapillary epitheliosis, are precancerous; mastopathies with regular epithelial proliferation are benign. (15 references)

4853 THE APUD CELL CONCEPT. (Eng.) Smith, L. H. (Pueblo Surgical Center, 222 W. Pueblo

St., Santa Barbara, CA 93105). *J Surg Oncol* 8(2): 137-142; 1976.

The APUD cell and its relation to the ectopic hormone syndrome and to the multiple endocrine adenomatosis (MEA) syndrome are discussed. APUD cells (an acronym for several cytochemical characteristics: high amine content, amine precursor uptake, and amino acid decarboxylation) are derived from primitive entoderm, where they differentiate into a family of hormone-producing cells. The ectopic hormone syndrome is the result of hormone production by a tumor derived from APUD cell neoplasia. APUD cell neoplasms include rectal carcinoid, pancreatic insulinoma, and oat cell carcinoma. The MEA syndrome consists of two different syndromes (i.e., Wermer's and Sipple's), which are determined by specifically associated simultaneous tumors. APUD cells of each syndrome may be derived from different areas of the neural crest, thus giving rise to the different types of tumors associated with each. The APUD cell concept provides a unifying principle for the understanding of many otherwise diverse and seemingly unrelated clinical conditions. (48 references)

4854 TOXICOLOGICAL PROBLEMS OF SEX HORMONES.

(Ger.) Bolt, H. M. (Institut fuer Toxikologie der Universitaet, Wilhelmstrasse 56, 74 Tuebingen, West Germany). *Fortschr Med* 94(13): 731-734; 1976.

This review of species differences in synthetic steroid metabolism, reproductive physiology, and sex hormone response begins with a discussion of chemical carcinogenesis and sex hormones, especially mammary tumorigenesis in dogs receiving long-term progesterone. Neither estrogens nor gestagens are mutagenic in bacterial test systems, nor do they bind covalently with nucleic acids, although some of their metabolites form compounds with proteins. Sex steroids affect hormone-dependent events unfavorably, as long as there is tissue receptor sensitivity; the vaginal effect of maternal diethylstilbestrol and the mammary effect of prolactin are examples. Reports of the mammary carcinogenicity of the 17α-hydroxyprogesterone series in female beagles must be considered against the background of a well-known high frequency of spontaneous tumors in this species (90% by age 10). Tumor sequelae of the progesterones are usually fibroadenomas, adenomas, and fibromas; spontaneous tumors are usually fibroadenomas. Only in the dog are estrogens unnecessary in stimulating tubular and lobuloalveolar growth, which follows from administration of progesterones alone, suggesting an effect of long-term overstimulation. (25 references)

4855 ESTROGENS AND MENOPAUSE.

(Eng.) Proudfit, C. M. (AMA Dept. Drugs, 535 N. Dearborn St., Chicago, IL 60610). *JAMA* 236(8): 939-940; 1976.

Evidence suggesting an association between the administration of estrogens to postmenopausal women and an increased risk of acquiring endometrial cancer is reviewed. A comparison of 94 endometrial cancer patients with 188 controls matched on the basis of age, area of residence, and length of time in the same health plan revealed that the estimated risk of acquiring endometrial cancer was 7.6 times higher for women who were treated with estrogens. The risk increased with length of time on the medication (5.6 times for 1-4.9 yr of use to 13.9 times for 7 yr or more of use). A comparison of women with endometrial cancer to women with other gynecologic neoplasms (cancer of the cervix, ovaries, or vulva) revealed that the risk of acquiring endometrial cancer was 4.5 times higher among women who had received estrogen therapy for menopausal symptoms. Estrogens for menopausal symptoms should be administered in a cyclic manner, usually 3 wk on and 1 wk off medication, to prevent unopposed stimulation of the endometrium and other target tissues. In general, the lowest dose consistent with relief of symptoms (0.3-1.25 mg conjugated estrogens or the equivalent) should be used. After estrogen treatment has been initiated, patients should be reevaluated at 6-mo intervals the first year and at least yearly thereafter. The Papanicolaou smear should include material obtained from the endocervical canal, since this modification enhances the otherwise unreliable detection of endometrial cancer. Based on present knowledge, the automatic administration of estrogens to all perimenopausal and postmenopausal women, except those sustaining oophorectomy before natural menopause, appears to represent an overuse of these drugs. (10 references)

4856 CHALONES: SPECIFIC REGULATORS OF EUKARYOTE TISSUE GROWTH.

(Eng.) Maurer, H. R. *In: Regulation of Growth and Differentiated Function in Eukaryote Cells*. Edited by G. P. Talwar. (New York, NY: Raven Press): pp. 69-77; 1975.

A theory of growth regulation based on a negative feedback mechanism involving the presence of inhibiting substances known as chalones is described along with evidence for the existence of such inhibitors. Although no chalone has been isolated in chemically pure form to date, chalones are known to be cell- and tissue-specific but species-unspecific factors (mostly proteins or polypeptides) that are not cytotoxic but are capable of inhibiting cell proliferation reversibly. Factors in mouse skin capable of inhibiting the mitotic activity of mouse epidermis in vitro and in vivo have been demonstrated that conform to the above characteristics. Evidence also exists that granulocytes produce a specific chalone and thus regulate their own proliferation. Autoradiographic studies have revealed that aqueous extracts of mature granulocytes specifically inhibit the proliferation of myelopoietic cells. Rat ascites ultrafiltrates produced by leukapheresis have been used as a chalone source to inhibit the proliferation of myelopoietic cells in microdiffusion chambers. Tumor cells have been shown to contain fewer chalone molecules than the tissue cells from which the tumor cells were derived. Higher-than-normal chalone concentrations have been observed in the serum of tumor-bearing animals, and the tumors in these animals react to the administration of homologous chalone by proliferation inhibition. Evidence thus far indicates that tumor cells leak chalones due to altered membrane permeability. Specific tumors that have been found to produce and contain chalones include: the Vx2 rabbit squamous carcinoma, the Harding-Passey mouse melanoma, an amelanotic hamster melanoma, Shay's myeloid rat chloroleukemia, the Hewitt mouse squamous carcinoma, and the L 5178Y mouse lymphoma. (17 references)

4857 PROTEOLYTIC ENZYMES OF MALIGNANT TISSUES.

(Pol.) Farbiszewski, R. (Akademia Medyczna, ul. Mickiewicza 2, 15-222 Bialystok, Poland); Worowski, K. *Postepy Biochem* 21(4): 407-423; 1975.

Recent experiments on the participation of proteolytic enzymes in the proliferation of neoplastic tissue have provided abundant data concerning the localizations, characteristics of enzyme activity, and the role of proteolytic enzymes in cell proliferation and differentiation. Proteolytic enzymes may cause structural changes in the surface layer of cell membranes and lead ultimately to disturbances in intercellular reactions and in the mobility of electrophoretic cells. Even trace amounts of protease can stimulate DNA synthesis and promote mitosis and cell division. The action of carcinogenic factors may result in a qualitative defect in DNA and the creation of altered mRNA; carcinogenic factors can also affect cell lysosomes and release hydrolytic enzymes. Proteolytic enzymes play an essential role in blood coagulation and fibrinolysis and in the growth of neoplastic metastases. With these interrelationships in mind, neoplastic proliferation and metastases could possibly be averted by activating the fibrinolytic system or restraining fibrin development. (136 references)

4858 RECENT DATA ON THE STRUCTURE AND MECHANISMS OF EXTRANUCLEAR DNA REPRODUCTION IN ANIMAL CELLS. (Rus.) Khanson, K. P. (Central Scientific Res. Inst. Roentgenology and Radiology, Ministry Public Health USSR, Leningrad, USSR). *Usp Sovrem Biol* 80(2): 166-184; 1975.

The structure and mechanisms of reproduction of cytoplasmic DNA in animal cells are reviewed on the basis of studies in the literature. The genetic system of the cells of higher organisms is presented together with nuclear DNA as a collection of molecular forms of DNA that are localized and function in the cytoplasm. Mitochondrial DNA is reproduced independently in subcellular organelles with the participation of intrinsic enzyme systems. Some of the other extrachromosomal DNAs probably have a nuclear derivation. A fully determined correlation is observed in the cellular cycle between phases of the synthesis of different types of DNA, with independent stimulation or selective inhibition of the synthesis found in some cases. In contrast to the abundant information on mitochondrial DNA participation in the information transfer in mitochondrial biogenesis and its regulatory effect on cell mitosis, similar data on other cytoplasmic DNAs are lacking. (138 references)

4859 POSSIBLE SIMILAR ROLE OF CYTOCHROME P450 IN PRIMORDIAL EVOLUTION OF SPECIES AND IN CHEMICAL CARCINOGENESIS (Eng.) Wickramasinghe, R. H. (Lab. Human Reproduction and Reproductive Biology, Dept. Biological Chemistry, Harvard Medical Sch., 45 Shattuck St., Boston, MA); Villee, C. A. *Perspect Biol Med* 19(4): 473-475; 1976. (16 references)

4860 PRODUCTION AND USE OF VINYL CHLORIDE: IMPACT OF THE LINK BETWEEN VINYL CHLORIDE MONOMER AND CANCER. (Eng.) Pregaglia, G. F. (Dept. Res. and Technology, Petrochemical Div., Montedison, Milan, Italy). *Adv Tumour Prev Detect Charact* 3: 209-215; 1976. (No references)

4861 THE SHAPE OF THE DOSE-RESPONSE CURVE FOR RADIATION CARCINOGENESIS AND EXTRAPOLATION TO LOW RADIATION DOSES (Meeting Abstract). (Eng.) Brown, J. M. (Dept. Radiology, Stanford Univ Sch. Medicine, Stanford, CA 94305). *Radiat Res* 67(3): 553; 1976. (No references)

4862 APPROACHES TO HUMAN RISK ESTIMATES FROM CYTOGENETIC OBSERVATIONS (Meeting Abstract). (Eng.) Preston, R. J. (Biology Div., Oak Ridge Natl. Lab., Oak Ridge, TN 37830). *Radiat Res* 67(3): 566; 1976. (No references)

4863 THE INITIAL PART OF THE SURVIVAL CURVE: IMPLICATIONS FOR LOW DOSE, LOW DOSE RATE RESPONSES (Meeting Abstract). (Eng.) Elkind, M. M. (Div. Biological Medical Res., Argonne Natl. Lab., Argonne, IL 60439). *Radiat Res* 67(3): 552; 1976. (No references)

4864 HUMAN DISEASE ASSOCIATED WITH EXPOSURE TO LIGHT. (Eng.) Herndon, J. H. (Univ. Texas Southwestern Medical Sch. at Dallas, Dallas, TX 75235); Freeman, R. G. *Annu Rev Med* 27: 77-87; 1976. (55 references)

4865 NEW MOLECULAR BIOLOGICAL FINDINGS ON SUBVIRAL COMPONENTS RELATED TO PRIMATE ONCOGENIC RNA TUMOR VIRUSES IN HUMAN LEUKEMIA. (Eng.) Gallo, R. C. *In: Molecular Base of Malignancy. New Clinical and Therapeutic Evidence. Selected Papers from an International Symposium.* Deutsch, E.; Moser, K.; Rainer, H.; Stacher, A., eds. (Stuttgart: Georg Thieme Publishers): pp. 171-178; 1976. (35 references)

4866 THE HOT PARTICLE ISSUE: EVIDENCE FROM EXPERIMENTAL ANIMAL STUDIES (Meeting Abstract). (Eng.) Little, J. B. (Lab. Radiobiology, Harvard Sch. Public Health, Boston, MA 02115). *Radiat Res* 67(3): 583-584; 1976. (No references)

4867 LATENCY IN HERPES SIMPLEX INFECTIONS. (Eng.) Stevens, J. G. (Reed Neurological Res. Center, Univ. California, Los Angeles, CA). *Adv Pathobiol* 5: 104-111; 1975. (25 references)

4868 ONCOGENIC VIRUSES IN VERTEBRATES TRANSMITTED BY HEMATOPHAGOUS ARTHROPODS. (Eng.) Rehacek, J. (Inst. Virology, Slovak Acad. Sciences, Bratislava, Czechoslovakia); Fischer, R. G.; Luecke, D. H. *Adv Virus Res* 20: 159-188; 1976. (117 references)

4869 ANTIGENIC SPECIFICITY OF CELL-MEDIATED ANTITUMOR REACTION IN THE MSV SYSTEM. (Eng.) Leclerc, J. C. (Laboratoire d'Immunologie des Tumeurs, Hopital Cochin, 27, rue du Faubourg Saint-Jacques, F-75014, Paris, France); Gomard, E.; Levy, J. P.; Senik, A. *Bibl Haematol (Basel)* (43): 173-176; 1976. (No references)

4870 HUMAN Ia-TYPE ALLOANTIGENS: METHODS OF DETECTION, ASPECTS OF CHEMISTRY AND BIOLOGY, MARKERS FOR DISEASE STATES. (Eng.) Wernet, P. (Dept. Medicine II, Univ. Tubingen, D-74 Tubingen, West Germany). *Transplant Rev* 30: 271-298; 1976. (50 references)

4871 THE ROLE OF CYCLIC NUCLEOTIDES IN MOLECULAR PATHOLOGY OF PROLIFERATIVE SKIN DISEASE. (Eng.) Voorhees, J. J.; Duell, E. A.; Stawiski, M.; Creehan, P.; Harrell, E. R. *In: Cyclic Nucleotides in Disease.* Weiss, B., ed. (Baltimore: University Park Press): pp. 79-101; 1975. (73 references)

4872 IMMUNOLOGY AND CANCER. HOW THE IMMUNE SYSTEM AFFECTS AND IS AFFECTED BY TUMOR GROWTH. (Eng.) Sharp, B. (Yale College, New Haven, CT). *Yale Scientific* 50(7): 24-29; 1976. (28 references)

4873 THE APPLICATION OF BANDING TECHNIQUES TO TUMOR CHROMOSOMES. (Eng.) Shaw, M. W.; Chen, T. R. *In: Chromosomes and Cancer.* German, J., ed. (New York: John Wiley & Sons): pp. 135-150; 1974. (37 references)

4874 NEW THOUGHTS ABOUT THE PHILADELPHIA CHROMOSOME (Meeting Abstract). (Eng.) Lawler, S. D. (Dept. Cytogenetics and Immunology, Div. Medicine, Inst. Cancer Res., London, England). *Br J Cancer* 34(3): 318; 1976. (3 references)

4875 THE NATURAL HISTORY OF HODGKIN'S DISEASE AND ITS CLASSIFICATION. (Eng.) Butler, J. J. *In: The Reticuloendothelial System.* Rebuck, J. W.; Berard, C. W.; Abell, M. R., eds. (Baltimore: The Williams & Wilkins Co.): pp. 184-212; 1975. (77 references)

4876 POSSIBLE OBSTETRIC FACTORS EFFECTING LEUKEMIA IN TWINS. (Eng.) Keith, L. (Northwestern Univ. Sch. Medicine, The Prentice Women's Hosp. and Maternity Center, 333 East Superior, Chicago, Il 60611); Brown, E. R.; Ames, B.; Stotsky, M. *Bibl Haematol (Basel)* (43): 221-223; 1976. (32 references)

4877 THE EPIDEMIOLOGY OF LEUKEMIA. (Eng.) Heath, C. W. *In: Cancer Epidemiology and Prevention: Current Concepts.* Schottenfeld, D., ed. (Springfield, IL: Charles C. Thomas): pp. 318-350; 1975. (304 references)

4878 CERTAIN CURRENT ONCOLOGICAL PROBLEMS OF THE GASTROINTESTINAL TRACT. (Ger.) Grabner, G. *In: Krebsbehandlung als interdisziplinare Aufgabe.* Kaercher, K. H., ed. (New York: Springer-Verlag): pp. 516-529; 1975. (32 references)

4879 POSITIVE IDENTIFICATION OF TOPOGRAPHIC FEATURES RESPONSIBLE FOR INTERCELLULAR ADHESION (Meeting Abstract). (Eng.) Howard, P. (Johns Hopkins Univ., Baltimore, MD); Wetzel, B.; Walther, B.; Chipowsky, S.; Roseman, S. *J Cell Biol* 67(2/Part 2): 179a; 1975. (3 references)

4880 RAPID TEST FOR SUSPECTED CARCINOGENS: MUTAGENICITY TESTING. (Ger.) Fahrig, R. (Zentrallaboratorium fuer Mutagenitaetspruefung, Deutsche Forschungsgemeinschaft, Freiburg i. Br., West Germany). *Umschau Wissenschaft Technik* 76(7): 224-225; 1976.

Yeast cells, rather than bacteria, were used in animal hosts to indicate gene mutation in carcinogenicity testing. Yeast suspensions were injected into the testicles and tail vein of rats, which resulted in rapid distribution to critical organs. The test agents, 4-nitroquinoline-N-oxide (4-NQO), dimethylnitrosamine (DMNA), nitrosoguanidine (NG), hycanthone (HC), endoxan (EN), and methylmethane sulfonate (MMS), were administered po, sc, or iv. After several hours of in vivo incubation, the yeast cells were removed from testicle, liver, and lung, and the number of mutant yeast cells was counted. Each agent had a characteristic tissue preference. 4-NQO, NG, and HC were most active in the lung; EN, MMS, and DMNA, in the liver. HC also had high testicular activity, while EN and MMS also had a high pulmonary effect. An indirect demonstration showed that the tissue specificity relates mutagenic and carcinogenic effects. (4 references)

4881 OCTOPINE AND NOPALINE SYNTHESIS AND BREAKDOWN GENETICALLY CONTROLLED BY A PLASMID OF *AGROBACTERIUM TUMEFACIENS*. (Eng.) Bomhoff, G. (Biochemisch Laboratorium Rijksuniversiteit Leiden, Wassenaarseweg 64, Leiden, The Netherlands); Klapwijk, P. M.; Kester, H. C. M.; Schilperoort, R. A.; Hernalsteens, J. P.; Schell, J. *Mol Gen Genet* 145(2): 177-181; 1976.

Several strains of *Agrobacterium tumefaciens*, which is oncogenic in wounded dicotyledoneous plants, were examined for oncogenicity, presence of plasmid, the utilization of either nopaline or octopine as a nitrogen source for growth, and the presence of nopaline or octopine in the induced tumor. Strains that induced tumors containing nopaline could utilize nopaline but not octopine for growth, and some strains that induced tumors containing octopine utilized octopine but not nopaline for growth. Nononcogenic, plasmid-free strains lost the ability of their parent strain to utilize either nopaline or octopine. The results are interpreted as indicating that the genetic information for the degradation of octopine or nopaline is located on a plasmid. Further, transfer of the plasmid from a nopaline degrading strain to a plasmid-free strain resulted in restoration of the ability to utilize nopaline. (25 references)

4882 ENHANCEMENT OF BASE PAIR SUBSTITUTION INDUCED BY ALKYLATING MUTAGENS IN SIMULATED HYPERBARIC DIVING ENVIRONMENTS. (Eng.) Wild, J. R. (Genetics Div., Dept. Plant Sciences, Texas A and M Univ., College Station, TX 77843). *Mutat Res* 38(4): 259-270; 1976.

The effect of simulated saturated diving environments on mutagenicity was investigated with two histidine auxotrophs (hisG46 and hisTA1950 from *Salmonella typhimurium* LT2) exposed to several chemical mutagens. In agar diffusion tests with impregnated paper disks, 68 atm of normoxic supporting gases (containing 0.2 atm O_2) reduced the number of histidine revertants of auxotrophs exposed to N-methyl-N'-nitro-N-nitrosoguanidine (NTG) and two other alkylating agents. The effect was induced in increasing order by helium, a mixture of neon and helium, nitrogen, and argon. The effect of the gases on the growth of the two strains was small and did not explain the reduction of revertant recovery. On the other hand, NTG in concentrations of 0.6 to 250 μg/ml was significantly more lethal for hisG46 under 68 and 136 atm than at 1 atm. Revertant recovery was similarly related in both conditions. The maximal number of revertants, approximately 2.6 x 10^4, was obtained at 136 atm when the concentration of NTG was 0.6-1.25 μg/ml and at 1 atm when the concentration of NTG was 5-10 μg/ml. A comparable hydrostatic environment did not affect revertant recovery. It is suggested that hyperbaric environments accelerate the intracellular accumulation rate of NTG, which is manifest in greater mutagenicity at the lower concentrations and greater lethality at all concentrations. (28 references)

4883 THE SPORULATION SYSTEM OF *BACILLUS SUBTILIS* AS THE BASIS OF A MULTI-GENE MUTAGEN SCREENING TEST. (Eng.) MacGregor, J. T. (Western Regional Res. Lab., Berkeley, CA 94710); Sacks, L. E. *Mutat Res* 38(4): 271-286; 1976.

The sporulation system of *Bacillus subtilis* was used to detect the forward mutations in any of several hundred genes in 28-45 separate operons scattered throughout the chromosome. Nonsporulating or oligosporogenous mutant colonies were easily identified by their lack of a brown pigment normally present in spore-forming colonies. The dose dependence of sporulation mutant induction by 2-nitrosofluorene, ICR-191, nitrogen mustard, ethidium bromide, and N-methyl-N'-nitro-N-nitrosoguanidine (MNNG) was demonstrated; mutagenesis was also demonstrated for aflatoxin B_1 and 4-nitroquinoline-N-oxide. A mammalian liver enzyme metabolizing system was necessary to activate aflatoxin B_1. Auramine-O and 4-nitro-o-phenylenediamine failed to give a significant mutagenic effect under the conditions employed. The wide variety of mutagen classes detected indicates the general applicability of this unique and simple test. It is based on many genes throughout the chromosome, and therefore may prove less apt to exclude rare mutagenic hot-spots than systems based on the detection of mutations in a restricted region of the chromosome. (60 references)

4884 BIOCHEMICAL CHANGES AND PULMONARY RESPONSE OF GUINEA PIGS TO ASBESTOS DUST. (Eng.) Singh, J. (Industrial Toxicology Res. Centre, Mahatma Gandhi Marg, Post Box No. 80, Lucknow, India); Beg, M. U.; Kaw, J. L.; Viswanathan, P. N.; Zaidi, S. H. *Acta Pharmacol Toxicol (Kbh)* 39(1): 77-86; 1976.

The biochemical and histopathological changes, especially in the phosphorylated compounds, in the lungs of 10 female guinea pigs were studied 120 days after intratracheal injection of chrysotile, amosite, or anthophyllite dust. The salient histopathological features were dust cell lesions in the lungs of animals exposed to the different varieties of asbestos. Maximum fibrosis and minimal asbestos body formation occurred in animals exposed to chrysotile and anthophyllite, respectively. Diffuse interstitial fibrosis developed with amosite and anthophyllite, accompanied by well-developed asbestos body formation in the amosite-exposed animals. There were significant alterations in the various phosphorylated compounds, an accumulation of orthophosphate and the depletion of esters and nucleotides being very marked. RNA content increased significantly in the amosite-treated group, but remained unaltered in the chrysotile group. (19 references)

4885 CYTOCHROME P-450 AND VITAMIN A INDUCTION IN PIGS EXPOSED TO DDT. (Fre.) Graillot, C. (Centre de Recherches toxicologiques, U.E.R. Mecanismes d'Action des Medicaments et des toxiques. Faculte des Sciences pharmaceutiques et biologiques. Universite Rene-Descartes, 75006 Paris, France); Gak, J.-C.; Ferrando, R.; Truhaut, R. *C R Acad Sci [D] (Paris)* 282(16): 1561-1563; 1976.

The effect of a high vitamin A diet on cytochrome P-450 levels in the livers of baby pigs administered DDT [1,1,1-trichloro-2,2-bis(p-chlorophenyl)ethane] was studied. DDT, 150 mg/kg, was added to the food of 2/6 pigs for 10 days. All six pigs had been fed a high protein diet containing 4,000 IU vitamin A and 1,000 IU vitamin D for 14 days prior to DDT administration. This diet was continued until the pigs were sacrificed at 24 days. The cytochrome P-450 levels were 230% higher and retinol levels were 45% lower in pigs given DDT. Gross liver wt increased 30% in these pigs over that of controls. The lobes of the liver in a single pig showed differences of 150% in concentration of cytochrome P-450. The study shows that DDT affects liver enzyme levels in the pig as in the rat and hamster. (8 references)

4886 DECIDUOMA FORMATION IN RATS WITH CORNIFIED VAGINA. (Eng.) Takewaki, K. (Endocrinology Lab., Dept. Biology, Kawasaki Medical Coll., Kurashiki, Okayama-ken 701-01, Japan); Ohta, Y. *Experientia* 32(2): 224-226; 1976.

The effects of 5α-dihydrotestosterone (DHT) (1.25 mg given sc on day 5 to T strain rats ovariectomized on day 4 of life) on deciduoma formation in the uterus and cornification of the vaginal epithelium were studied. Estradiol-17β (OD) (0.2 μg sc for 3 days, followed by a 2-day interval, followed by OD treatment for 7 days) and progesterone (P) (2 mg given daily sc during the second period of OD treatment) were administered to the DHT-treated and control animals beginning on day 60 of life, and on day 69, the right uterine horn of each animal was scratched longitudinally along its entire length. In four of the eight DHT-treated rats, the vagina was patent on day 50, whereas after 2 days of P-OD treatment, vaginal smears typical of proestrus or estrus occurred in seven of the animals. In three of the seven rats, the smears were predominantly cornified until the last injection, but they became leukocytic again in the remaining four. Histologically, the vagina was largely lined with a stratified squamous noncornifying epithelium. All animals elicited deciduomas in response to uterine trauma. In the ovariectomized rats not treated with DHT, the vagina became patent after the 3-day priming with OD; predominantly cornified smears were obtained, but they remained leukocytic. These animals responded to uterine trauma by deciduoma formation. In the control group, the vaginal epithelium consisted of two to three layers of small cells, and the vaginal lumen was almost empty. In the DHT-treated rats, the vaginal epithelium consisted of two to six layers of much larger cells, and the vaginal lumen was distended with numerous leukocytes: the lamina propria was diffusely infiltrated with lymphocytes and plasma cells. The data indicate that treatment of female rats with DHT early in postnatal life induces long-lasting alterations in the reactivity of the vaginal mucosa to hormones. (1 reference)

4887 COVALENT INTERACTION OF METABOLITES OF THE CARCINOGEN TRICHLOROETHYLENE IN RAT HEPATIC MICROSOMES. (Eng.) Van Duuren, B. L. (New York Univ. Medical Center, New York, NY 10016); Banerjee, S. *Cancer Res* 36(7): 2419-2422; 1976.

Trichloroethylene (TCE), a structural analog of vinyl chloride, induces hepatocellular carcinoma and other tumors in B6C3F$_1$ hybrid mice. TCE epoxide, a possible metabolite, is expected to be highly reactive toward cellular nucleophiles; such as, proteins and nucleic acids. Hence, the microsomal metabolism of TCE and its covalent binding to microsomal protein were examined. Rat liver microsomes from male Sprague-Dawley rats were incubated in vitro with ^{14}C-TCE. The results showed that TCE binds covalently to microsomal protein, since extensive organic extractions and Pronase digestion do not dissociate the TCE-protein complex. The binding was decreased by 7,8-benzoflavone, blocked by 2-diethylaminoethyl-2,2-diphenylvalerate•HCl (SKF-525A), and enhanced by ip administration of phenobarbital. The possibility that TCE epoxide, once formed, could be converted to water-soluble products through enzymatic hydrolysis by epoxide hydrase was also investigated. Addition of 3,3,3-trichloropropene oxide, a potent inhibitor of epoxide hydrase, to the incubation system markedly enhanced TCE binding. These observations support the view that, in order to bind to protein, it is necessary for TCE to be metabolized to its epoxide, a reactive intermediate that is most likely involved in TCE carcinogenesis and toxicity. (20 references)

4888 VARIOUS DEGREES OF SUSCEPTIBILITY OF DIFFERENT STOCKS OF RATS TO N-2-FLUORENYLDIACETAMIDE HEPATIC CARCINOGENESIS. (Eng.) Reuber, M. D. (11014 Swansfield Rd., Columbia, MD 21044). *J Natl Cancer Inst* 57(1): 111-114; 1976.

Outbred Osborne Mendel, Japanese, Wistar, NIH Black, and Sprague-Dawley male rats 12 wk of age were fed a semisynthetic diet containing 0.025% N-2-fluorenyldiacetamide. The Sprague-Dawley and NIH Black rats were most susceptible to the development of carcinomas and cirrhosis of the liver, and they also had the highest incidence of metastases. More and larger carcinomas per liver and more poorly differentiated and undifferentiated carcinomas were found, as well as more advanced cirrhosis. Japanese and Wistar rats were less susceptible to hepatic carcinogenesis and cirrhosis. These rats had fewer and smaller hepatic carcinomas per liver, and the neoplasms were well-differentiated. By contrast, Osborne Mendel male rats were least susceptible to hepatic carcinogenesis and cirrhosis. (34 references)

4889 CHANGES IN HEPATIC NUCLEI INDUCED BY ACETAMIDE AND THIOACETAMIDE. (Eng.) Olason, D. (Dept. Pathology, Univ. Washington Sch. Medicine, Seattle, WA). *Arch Pathol Lab Med* 100(8): 415-418; 1976.

Liver nuclei were examined following the intoxication of male Sprague-Dawley rats with thioacetamide or acetamide. Each compound was given by gastric intubation at the following doses per 100 g body wt: 67 or 268 mmol thioacetamide or 268 mmol acetamide. The size of the nuclei increased promptly upon the administration of either agent. The acetamide-related change was evanescent and, by 16 hr, the nuclei did not differ from controls. Thioacetamide produced an acute enlargement during the first 8 hr and a second, more prolonged increase during the next 24 hr. The enlargement noted by microscopy was also detectable in isolated nuclei by flow spectrometry. Chemical determinations on isolated nuclei appeared to sample the same size population seen in situ. An increase in RNA content of the thioacetamide-treated nuclei occurred during the late phase. The temporal sequence of physical and chemical change suggests that the initial increase in nuclear volume is not the result of retained macromolecular formation but may involve intracellular water and electrolyte shifts. (16 references)

4890 ACTION OF VITAMIN A ON THE DEGREE OF ENZYME INDUCTION. (Fre.) Gak, J. C. (Centre de Recherches Toxicologiques, Faculte des Sciences Pharmaceutiques et Biologiques, Universite Rene Descartes, 75720 Paris Cedex 06, France); Graillot, C.; Ferrando, R.; Truhaut, R. *Med Chir Dig (Suppl 2)* 53-55; 1975.

DDT [1,1,1-trichloro-2,2-bis(p-chlorophenyl)ethane] was chosen as the substrate on which to study the influence of vitamin A on the level of enzyme induction. Immediately after they were weaned, 72 male Wistar rats, born to mothers treated with a low dose of retinol, were put on a diet deficient in vitamin A. Ten days later, the animals were divided into six groups, all with the same basic regimen plus the following specifications: (1) no DDT, no vitamin A; (2) 5 mg DDT, no vitamin A; (3) no DDT, 10 μg vitamin A; (4) 5 mg DDT, 10 μg vitamin A; (5) no DDT, 25 μg vitamin A; (6) 5 mg DDT, 25 μg vitamin A. The DDT and vitamin were given po in peanut oil. Thirty days later, all the animals were sacrificed at the same time and their livers immediately removed. The livers were weighed and divided into three portions, the first to measure the dosage of cytochrome P-450, the second to measure the hepatic storage of vitamin A, and the third for histological study. Despite a daily intake of 5 mg DDT, the hepatic level of cytochrome P-450 declined markedly in the absence of vitamin A when compared to that of the group without DDT or vitamin A. This decline ceased with a daily dose of 10 μg retinol. The level of cytochrome P-450 rose in the rats receiving both DDT and vitamin A compared to the rats getting vitamin A alone. The significant differences in cytochrome P-450 level between groups 3 and 4, 2 and 4, 4 and 6 underlined the necessity of adding retinol to enable DDT to act as an enzyme inducer. The 25-μg dose of vitamin A did not result in a greater induction of cytochrome P-450, but provided a greater efficiency of protein metabolism than the 10 μg ration. With or without vitamin, DDT increased the ratio of liver wt to body wt. The experiment showed that the action of DDT and probably of other inducers of cytochrome P-450 is suppressed or curtailed by the absence of vitamin A. (19 references)

4891 ULTRASTRUCTURAL AND CYTOCHEMICAL STUDIES ON HYPERBASOPHILIC FOCI WITH SPECIAL REFERENCE TO THE DEMONSTRATION OF CELL SURFACE ALTERATIONS IN HEPATOCARCINOGENESIS. (Eng.) Karasaki, S. (Institut du Cancer de Montreal, Centre Hospitalier Notre-Dame, 1560 Sherbrooke est, Montreal 133, Canada H2L 4MI). *Cancer Res* 36(7): 2567-2572; 1976.

Hyperbasophilia, due to an increased dye binding of cytoplasmic RNA components, is a distinctive parameter for the transitional cells between hyperplasia and neoplasia. Prior to the emergence of hepatocarcinomas, hyperbasophilia foci (HBF) are seen in livers of rats fed a low protein diet containing the aminoazo dye N,N'-dimethylaminoazobenzene (DAB). Experiments were extended to cultured liver epithelial cell lines derived from the precancerous livers of DAB-fed rats and normal adult livers to determine whether cell surface alterations observed in preneoplasia represent critical events of hepatocarcinogenesis. Following the formation of hyperplastic nodules at a late stage of azo dye hepatocarcinogenesis, some areas of parenchyma showed an intense RNA staining; these HBF apparently developed hepatomas. Radioautographic analyses with ^{3}H-thymidine indicated the foci to be areas of continued cell proliferation. The hepatocytes were morphologically distinguishable from the surrounding tissue. The increase of basophilia occurred simultaneously with histochemically demonstrable decreases in bound cations and concomitant increases in pyroantimonate-precipitable free cations. Thus, hyperbasophilia and the ensuing alteration of the cell cycle appeared to be associated with changes in intracellular homeostasis. Ultrahistochemical localizations of adenosine triphosphatase and alkaline phosphatase suggested topographic alterations of membrane enzyme activities in the foci and the persistence of altered patterns during tumor progression. The development of surface adenosine triphosphatase activity was further studied with subcultures of epithelial cells derived from normal and precancerous livers. The enzyme activity of nontumorigenic cells was minimal, but a considerably high activity was detected in situ at the outer surface of the plasma membranes of tumorigenic cells. A Ca^{2+}-Mg^{2+}-dependent adenosine triphosphatase was identified at the cell surface; the ectoenzyme could be a useful marker for the detection of malignant liver epithelial cells. (47 references)

4892 LIGHT AND SCANNING ELECTRON MICROSCOPY OF EXFOLIATED BLADDER EPITHELIAL CELLS IN RATS FED N-[4-(5-NITRO-2-FURYL)-2-THIAZOLYL]FORMAMIDE. (Eng.) Jacobs, J. B. (Dept. Pathology, St. Vincent Hosp., Univ. Massachusetts Medical Sch., Worcester, MA 01610); Arai, M.; Cohen, S. M.; Friedell, G. H. *J Natl Cancer Inst* 57(1): 63-66; 1976.

Urine specimens obtained periodically from weanling male F344 rats fed 0.2% N-[4-(5-nitro-2-furyl)-2-thiazolyl]formamide (FANFT) for 25 wk followed by control diet for 35 wk were examined by light microscopy (LM) and scanning electron microscopy (SEM). LM revealed RBC and atypical transitional cells in the urine at 25 and 43 wk, when microinvasive transitional cell carcinoma was present. Malignant transitional cells were seen in the urine by LM at 60 wk, when muscle invasion was present in histologic sections. However, SEM showed pleomorphic microvilli on exfoliated urothelial cells as early as 10 wk after FANFT administration, and the microvilli became increasingly pleomorphic as the bladder lesions progressed to muscle invasion at 60 wk. Noninvasive tumors were present in histologic sections of rat bladders examined at the end of 10 wk of FANFT administration. The numerous microvilli on exfoliated bladder tumor cells were in sharp contrast to the peaked microridges of normal exfoliated superficial cells. The results show that the study of exfoliated urothelial cells by light and electron microscopy is a useful nonintrusive means of following the development of these bladder lesions. (7 references)

4893 TRANSPLACENTAL ONCOGENIC EFFECT OF ETHYLNITROSOUREA IN RABBITS. (Ger.) Stavrou, D. (Lehrstuhl fuer Allgemeine Pathologie und Neuropathologie, Universitaet Muenchen, D-8000 Muenchen 22, Veterinarstr. 13, West Germany); Haenichen, T.; Wriedt-Luebbe, I. *Z Krebsforsch* 84(2): 207-215; 1975.

The offspring of three rabbits receiving ethylnitrosourea during pregnancy were followed to establish tumor incidence. The maternal dose was 50 mg/kg iv during the final week of gestation. Of 22 offspring, 16 were followed for 2-1/2 yr. All were grossly normal during the period, except for hematuria in two. After the 2-1/2-yr latent period, 12 renal tumors, the invasiveness of which was macroscopic, were found. Ten were diagnosed as an adenocarcinoma-sarcoma (A-S), one as an adenocarcinoma, and one as a polymorphic sarcoma. In the A-S type, both mesenchymal and epithelial elements were variously involved in extensive parenchymal erosion. Spindle-shaped cell networks, with a high fibril content but no obvious muscle fibers or other evidence of mesenchymal differentiation, intruded in the areas of the epithelial atypia, which was characterized by a high stromal content. The adenocarcinoma was typical, corresponding only to the affected glandular areas of A-S. The polymorphic sarcoma featured bizarre giant cells with regressive foci. A liver metastasis was identified. The dominant A-S tumor, with its infiltrative-destructive growth, absence of unequivocal adenomatous pattern, infrequency of clear-cell formation, and absence of chromophobic or oncocytic responses, resembled a Wilms' nephroblastoma. (20 references)

4894 ONTOGENY AND EVOLUTION OF NORMAL AND MALIGNANT HEMATO-POIETIC CELLS. PROLIFERATION OF HEMOPOIETIC STEM CELLS AND DEVELOPMENT OF POTENTIALLY LEUKEMIC CELLS IN VITRO. (Eng.) Dexter, T. M. (Christie Hosp. and Holt Radium Inst., Manchester M20 9BX, England); Lajtha, L. G. *Bibl Haematol (Basel)* (43): 1-5; 1976.

A culture system for the propagation of bone marrow cells is reported, and the induction of leukemia in mice inoculated with cultured bone marrow cells from mice treated with methylnitrosourea (MNU) is described. Cultures of normal cells formed both erythroid and granulocytic spleen colonies and were able to protect potentially lethally irradiated mice from hematopoietic death. For the first few weeks the cultures contained mainly granulocytes and macrophages, but subsequently up to 70% blast cells were observed. Injection of cells by various routes at various times into normal, radiation immunodepressed or T cell-deficient mice failed to induce leukemia in 39 animals. Freshly removed bone marrow cells from female BDF_1 mice inoculated with a single iv dose of MNU (50 mg/kg) failed to induce leukemia in other mice when cells were removed 1-70 days after MNU treatment. Cultured marrow cells from MNU-treate mice, like those from normal mice, developed an accumulation of blast cells. After 10 wk in culture, spleen colonies revealed mainly undifferentiated cells, at which time the protective ability of the cells was lost. Injection of cultured MNU-treated cells produced leukemia in 15/22 cases within 11/18 wk. Injection of irradiated cells of cell-free supe natants did not cause leukemia. In 13/15 leukemias there was massive and widespread lymph node and splenic enlargement, without involvement of the thymus. All 13 of these leukemias arose in female mice. The two leukemias that arose in male mice wer the result of cells derived from female mice. In th five cases of female leukemia tested for theta-anti and surface immunoglobulin determinants, all were negative; they were also peroxidase-negative. The two male leukemias were theta-positive and involved the liver. (9 references)

4895 IN VITRO DETECTION OF NITROSAMINES AND OTHER INDIRECT ALKYLATING AGENTS BY REACTION WITH 3,4-DICHLOROTHIOPHENOL IN THE PRESENCE OF RAT LIVER MICROSOMES (Letter to Editor). (Eng.) Preussmann, R. (German Cancer Research Center, Inst Toxicol. Chemotherapy, D-6900 Heidelberg, West Germany); Arjungi, K. N.; Ebers, G. *Cancer Res* 36(7): 2459-2462; 1976.

A new method for the detection of indirect alkylati agents such as the nitrosamines using 3,4-dichlorothiophenol as a trapping agent in the presence of female Sprague-Dawley rat liver microsomes is reported. 3,4-Dichlorophenyl alkyl thioethers were detected by a gas chromatography-mass spectrometry combination unit and quantified by external standards. Methylalkylnitrosamines predominantly give rise to 3,4-dichlorophenyl methyl thioether compared with other alkyl thioethers. Branching in the α position of the alkyl chain of the nitrosamines reduces the amount of the alkyl thioethers formed. Symmetrical dialkylnitrosamines preferentially give rise to methyl thioether compared with the corresponding alkyl thioethers. The results show a good relationship between carcinogenicity and alkylating capacity of the nitrosamines and are in agreement with the in vivo studies on alkylation of nucleic acids with different nitrosamines. This method can be used as a rapid screening technique to detect indirect alkylating agents. (14 references)

4896 CHANGES IN FREE AND MEMBRANE-BOUND POLYRIBOSOMES OF THE RAT LIVER IN HEPATOCARCINOGENESIS INDUCED BY DIETHYLNITROSAMINE. (Ukr.) Osipova, L. O. (Inst. Problems Oncology, Acad. Sciences Ukrainian SSR, Kiev, USSR); Grinchishin, V. P.; Bikoriz, A. I. *Dopov Akad Nauk Ukr RSR Ser B* (4): 344-347; 1976.

Data on the biochemical and histological changes in the livers of rats receiving 0.065% diethylnitrosamine with their drinking water are presented. Ribosomes were isolated by sucrose gradient centrifugation and identified spectrophotometrically. Protein synthesis during hepatocarcinogenesis was characterized by three stages. In the first (1-3 wk), a sharp decrease in total and membrane-bound polyribosomes and an increase in free polyribosomes occurred concurrently with destructive changes in the liver (dystrophy, necrobiosis, and structural changes). In the second stage (1-4 mo), total and membrane-bound polyribosome levels increased slightly, and regenerative hyperplasia of the hepatocytes and adenomatous transformation of the parenchyma occurred. The increases in the ribosome levels may be due to renewal of a cell population resistant to the carcinogen. In the third stage (6 mo), malignant characteristics appeared together with decreases in membrane-bound polyribosomes and increases in free polyribosomes. (11 references)

4897 NUCLEIC ACIDS FROM SUBCELLULAR FRACTIONS OF N-NITROSODIETHYLAMINE-INDUCED HEPATOMA IN MICE. (Eng.) Shaposhnikov, J. D. (Lab. Experimental Tumors, Petrov Res. Inst. Oncology, USSR Ministry Public Health, Pesochny-2, Leningrad 188646, USSR); Shalumovich, W. N.; Kisselev, O. I.; Gaitskhoki, V. S.; Pozharisski, K. M. *J Natl Cancer Inst* 57(1): 23-31; 1976.

During eight successive isologous passages of hepatoma induced in male C3HA mice by N-nitrosodiethylamine, both the mitotic pattern and ploidy differed from generation to generation, allowing the biochemical examination of material least changed due to tumor progression. Tumor nDNAs were characterized by greater actinomycin D (AD) and acridine orange (AO) binding abilities than normal nDNAs; this could have resulted from a higher proportion of double-stranded regions in tumor DNA. Isolated tumor deoxyribonucleoprotein had both lower template activity in an RNA polymerase system and fewer AD and AO binding sites, compared with the normal mouse liver. RNA-DNA hybridization data plus the above findings showed that in hepatoma, part of the nuclear genome was repressed. Also, ''new classes'' of RNA appeared and a certain proportion of nuclear genes controlling mitochondrial protein biosynthesis were derepressed in tumor mitochondria. The hybridization of mitochondrial RNA (mtRNA) and DNA revealed new classes of pulse-labeled RNAs in in vitro incubated liver mitochondria that were absent from intact cell organelles; the hybridization properties of in vivo and in vitro hepatoma mtRNAs were similar. Competition and hybridization experiments demonstrated that in tumor mitochondria in vivo, some new classes of RNA existed. Hepatoma mitochondrial mRNA had a higher metabolic stability than normal mRNA. (50 references)

4898 CYTOLOGICAL VARIABILITY OF RAT NITROSAMINE-INDUCED TUMORS TRANSPLANTED IN THE ANTERIOR CHAMBER OF THE EYE. (Rus.) Shvemberger, I. N. (Inst. Cytology, Acad. Sciences USSR, Leningrad, USSR). *Tsitologiia* 17(10): 1189-1193; 1975.

Twelve rat liver tumors (high, purely, and low differentiated hepatomas and adenocarcinomas), 3 kidney tumors, 1 lymphosarcoma, and 1 round cell sarcoma of the uterus were transplanted and passed through the anterior chamber of allogenic rat eyes. Differentiation traits increased in eight primary transplants of the liver tumors, three of them morphologically indistinguishable from normal liver tissue. Morphological signs of dysplasia were manifested in some transplants of the liver and kidney of rat embryos. In some transplants, lymphosarcoma cells lost cytologic signs of dysplasia, and transplants were largely reminiscent of lymphoma. Transplants of all five generations of round cell sarcoma of the uterus suggested the original tumor and were diagnosed as round cell sarcoma of unknown histogenesis. The findings attest to the wide range of cytologic changes in the early stages of tumor progression. The immunologic status of the anterior chamber of the eye may preserve differentiated cells that would ordinarily be driven out by the recipient organism because of their heightened antigenicity compared with other, relatively undifferentiated cells. Tumor transplantation in the anterior chamber of the eye appears to be an adequate model for showing the capacity of normal and tumor tissue for cytologic variability.

4899 STRUCTURAL LIMITS OF SPECIFICITY OF METHYLCHOLANTHRENE-REPRESSIBLE NITROSAMINE N-DEALKYLASES. INHIBITION BY ANALOG SUBSTRATES. (Eng.) Arcos, J. C. (Seamen's Memorial Res. Lab., US Public Health Service Hosp., 210 State St., New Orleans, LA 70118); Bryant, G. M.; Pastor, K. M.; Argus, M. F. *Z Krebsforsch* 86(2): 171-183; 1976.

The dealkylation of dimethyl-, diethyl- and dipropylnitrosamine by hepatic microsomes of Sprague-Dawley rats was repressed by pretreatment of the animals with 3-methylcholanthrene (MC), and this repression progressively decreased with increasing alkyl chain length. In contrast to its effect on the demethylation of dimethylnitrosamine (DMN), in vivo phenobarbital induced rather than repressed the deethylation of diethylnitrosamine. The demethylation of the DMN analog substrates (dimethylformamide, dimethylacetamide, dimethylpropionamide, and dimethylbutyramide), although low as compared to DMN, increased with the acyl chain length. These analogs were potent in vitro inhibitors of DMN demethylation when used in combination with DMN as substrates, and the inhibition decreased with the length of the acyl chain. Dimethylaminoacetone was not an in vitro inhibitor of DMN demethylation; the demethylation rates were additive when this compound was used as substrate in combination with DMN. The demethylation rate of dimethylaminoacetone was substantially higher than the rates of the dimethylacylamides and was significantly repressed by MC pretreatment. The demethylation of methylphenylnitrosamine was not influenced by MC pretreatment; the compound was, however, a potent inhibitor of demethylation when used as substrate in combination with DMN. The demethylation rates of 1,1-dimethylhydrazine (the reduction product of DMN) and dimethylaniline were not influenced by MC pretreatment; also, these two compounds did not affect the overall rate of demethylation when used as a substrate in combination with DMN. (32 references)

4900 INFLUENCE OF REGENERATIVE CAPACITY AND INNERVATION ON ONCOGENESIS IN THE ADULT FROG (*RANA PIPIENS*). (Eng.) Outzen, H. C. (Inst. Cancer Res., Fox Chase Cancer Center, Philadelphia, PA 19111); Custer, R. P.; Prehn, R. T. *J Natl Cancer Inst* 57(1): 79-84; 1976.

The frog *Rana pipiens* was used to study the effect on chemical oncogenesis of surgically increasing or decreasing the nerve supply to the forelimbs. Twenty-two sarcomas were induced in 19 adult frogs treated with 3-methylcholanthrene pellets. Thirteen of these tumors arose first in a denervated forelimb, and only two arose first in normal or nerve-supplemented control forelimbs. The remaining tumors developed either as a second tumor in a tumor-bearing frog or in the hindlimbs. The critical role of innervation in regenerative capacity suggests that the predilection to tumor formation in the denervated limbs may have resulted from their lessened regenerative capacity. (23 references)

4901 PHOTOCHEMICAL REACTION OF CHOLESTEROL INTERACTION WITH CARCINOGENIC POLYCYCLIC HYDROCARBONS. (Rus.) Tabatadze, L. G. (Tiflis State Univ., Tiflis, USSR); Tsartsidze, M. A.; Lomsadze, B. A. *Soobshch Akad Nauk Gruz SSR* 80(2): 457-460; 1975.

Spectroscopic and thin layer chromatographic assays of the reaction between cholesterol and three polycyclic hydrocarbons are reported. Reaction mixtures were allowed to stand at ambient temperatures under exposures of up to 3 mo to visible light and 8 hr to UV light. Cholesterol was not reactive with anthracene. The reaction with 3,4-benzpyrene in visible light showed reduced cholesterol activity, possibly due to esterification. The evidence suggests a donor-acceptor type of reaction (rather than a reaction due to the concentration of oxygen), leading to a charge-transfer complex and the eventual formation of free radicals. 20-Methylcholanthrene reacted similarly with cholesterol, but only transiently. All three hydrocarbons oxidize cholesterol, or its products, under UV radiation.

4902 NITROSATION OF NICOTINE AND NORNICOTINE AND THE FORMATION OF N-NITROSONORNICOTINE IN THE STOMACH OF SMOKERS. (Ger.) Schweinsberg, F. (Hygiene-Institut der Universitaet, D-7400 Tubingen, West Germany); Sander, J.; Schweinsberg, E.; Kollat, P. *Z Krebsforsch* 84(1): 81-87; 1975.

Gastric juice from 14 volunteers who had smoked 280 cigarettes was assayed to determine the extent of nicotine and nornicotine nitrosation. About 11% of nornicotine in tobacco smoke is dissolved in saliva. In saliva, the nitrosamine yield from nicotine exposure was about 100 times lower than that from nornicotine. No N-nitrosonornicotine could be demonstrated above 5 ppb in the gastric juice; perhaps some was resorbed or passed by the duodenum. Nitrite levels in neutral gastric juice ranged between 15 and 250 ppm, and they were not elevated by smoking. (8 references)

4903 A RAPID METHOD FOR THE DETERMINATION OF BENZO(A)PYRENE, BENZO(A)ANTHRACENE AND CHRYSENE IN CIGARETTE SMOKE. (Ger.) Klimisch, H.-J. (Forschungsinstitut der Cigaretteninindustrie e.V., D-2000 Hamburg 54, West Germany); Kirchheim, E. *Chromatographia* 9(3): 119-122; 1976.

A novel method using two thin-layer chromatographic assays and a quantitative in situ determination of polycyclic aromatic hydrocarbons in cigarette smoke is reported. Benzo(a)pyrene, benzo(a)anthracene, and chrysene have been 91%-95% recovered after purification on aluminum oxide plates, separation on cellulose acetate sheets, and direct in situ measurement. Assay time does not exceed 8 hr. (12 references)

4904 TWO-STAGE CHEMICAL ONCOGENESIS IN CULTURES OF C3H/10T1/2 CELLS. (Eng.) Mondal, S. (Medical Sch., Univ. Wisc., Madison, WI 53706); Brankow, D. W.; Heidelberger, C. *Cancer Res* 36(7): 2254-2260; 1976.

Data that establish a two-stage process of oncogenic transformation in C3H/10T1/2 clone 8 mouse embryo cells using polycyclic hydrocarbons and phorbol and three of its esters are presented. The initiation and promotion stages of chemical oncogenesis have been demonstrated in these cells. Treatment of the cells with a subeffective concentration of 3-methylcholanthrene, benzo(a)pyrene, or 7,12-dimethylbenz(a)anthracene, followed 4 days later by a nontransforming amount of tetradecanoylphorbol acetate (TPA), phorbol didecanoate, or 4-α-phorbol didecanoate, produced transformation. Phorbol was ineffective. TPA did not select for transformed cells. When TPA treatment preceded 3-methylcholanthrene, transformation was not enhanced. When TPA was added immediately after hydrocarbon treatment, there was a significant inhibition of transformation. Preliminary evidence suggests that TPA produces an immediate inhibition of DNA synthesis, which prevents the cell divisions required to fix the transformed state. TPA did not exert promoting activity when the hydrocarbons were in high enough concentrations to produce appreciable transformation. The promoting action of TPA cannot be attributed only to a stimulation of cell division. Attempts are being made to identify a property in TPA specific for promotion over and above cell division stimulation, since these studies indicate the possibility of developing a rapid prescreening system for environmental promoting agents. (32 references)

4905 STIMULATORY EFFECT OF VEGETABLES ON INTESTINAL DRUG METABOLISM IN THE RAT. (Eng.) Pantuck, E. J. (Presbyterian Hosp., 622 W. 168th St., New York, NY 10032); Hsiao, K.-C.; Loub, W. D.; Wattenberg, L. W.; Kuntzman, R.; Conney, A. H. *J Pharmacol Exp Ther* 198(2): 278-283; 1976.

Because vegetables commonly present in the human diet may influence the intestinal metabolism and bioavailability of various drugs, the authors studied the effects of Brussels sprouts and cabbage on drug metabolism in male Long-Evans rats. The intestinal metabolism of hexobarbital, phenacetin, 7-ethoxycoumarin, and benzo[a]pyrene in vitro was increased in rats fed dried Brussels sprouts or dried cabbage in a semisynthetic diet compared to rats fed only the semisynthetic diet. Pretreatment of rats with several indoles present in Brussels sprouts and cabbage (indole-3-acetonitrile, indole-3-carbinol, and 3,3'-diindolylmethane) also stimulated intestinal drug metabolism, but the effect was smaller than when the vegetables were fed. The results suggest a need for similar studies in man. (18 references)

4906 A SIMPLE RADIOASSAY OF BENZO(a)PYRENE ACTIVATION: OBSERVATIONS ON THE COVALENT INTERACTIONS OF BENZO(a)PYRENE WITH PROTEIN. (Eng.) Thomas, F. B. (Univ. Texas System Cancer Center, M. D. Anderson Hosp. and Tumor Inst., Houston, TX 77025); Furlong, N. B. *Anal Biochem* 72(1/2): 546-551; 1976.

A simple radioassay method is described to measure specifically and quantitatively the metabolic activation of the carcinogen benzo(a)pyrene (BP) to a derivative that reacts covalently with a macromolecular target molecule (protein). All procedures were performed under subdued or yellow light and required a minimum assay volume of 50 μl. BP was activated by addition of the microsome suspension in such a way that the final reaction mix contained 0.03 M Tris-hydrochloride (pH 7.5), 3 mM $MgCl_2$, 1 mM $NADPH_2$, 25 μg of bovine serum albumin, and 500-1,000 pmoles of BP including 0.25 μCi of ^{3}H-BP. BP and its metabolites were separated chromatographically from the protein by the benzene:ethanol (9:1 v/v) solvent system. The amount of BP bound to protein was quantified by the difference between the radioactivity at the 0- and 30-min origins of each sample, compared with the total tritium content of 10 μl of the reaction mix. The $NADPH_2$-dependent formation of the macromolecule-hydrocarbon complex during incubation with Holtzman rat liver microsomes was linear over a 30-min period and occurred at a rate that was approximately 60% that of phenolic BP derivatives. No such product was formed during incubation with either heat-inactivated microsome preparations or bovine serum albumin. Inhibition of this reaction by sodium azide was seen only at concentrations of 0.1 M or greater and was not distinguishable from inhibition by sodium chloride at similar levels. These observations suggest that Fe^{3+}-protoporphyrin is not essential for BP activation. (18 references)

4907 COVALENT BINDING TO PROTEIN OF THE K-REGION OXIDE OF BENZO[a]PYRENE FORMED BY MICROSOME INCUBATION. (Eng.) Raha, C. R. (Eppley Inst. Res. in Cancer, Univ. Nebraska Medical Center, 42nd St. and Dewey Ave., Omaha, NB 68105); Gallagher, C. H.; Shubik, P.; Peratt, S. *J Natl Cancer Inst* 57(1): 33-38; 1976.

Incubation of 20,000 x g supernatant proteins of rat liver with benzo[a]pyrene (BP) and appropriate cofactors produced metabolites of BP covalently bound at the 4,5-position to protein. After incubation, protein samples were freed from noncovalently bound metabolites and hydrolyzed chemically and/or enzymatically. All steps were performed under minimum exposure to light and air; benzene extracts were prepared during hydrolysis. Chemical hydrolysis released the K-region metabolite BP-4,5-dihydrodiol and BP. Hydrolysis with trypsin and pronase gave products with the characteristic UV spectrum of substituted chrysene. Chemical hydrolysis of these products released BP and BP-4,5-dihydrodiol. (34 references)

4908 THE INVOLVEMENT OF A DIOL-EPOXIDE IN THE METABOLIC ACTIVATION OF BENZO(a)PYRENE IN HUMAN BRONCHIAL MUCOSA AND IN MOUSE SKIN. (Eng.) Grover, P. L. (Chester Beatty Res. Inst.: Inst. Cancer Res., Royal Cancer Hosp., Fulham Road, London SW3 6JB, England); Hewer, A.; Pal, K.; Sims, P. *Int J Cancer* 18(1): 1-6; 1976.

DNA was isolated from human bronchial segments treated in short-term organ culture with ^{3}H-benzo(a)-pyrene (BP) and from mouse skin treated with ^{3}H-BP; with the related radioactive 4,5-, 7,8-, and 9,10-dihydrodiols; and with ^{3}H-3-hydroxybenzo(a)pyrene. Sephadex LH20 column chromatography of hydrolysates of these DNA samples showed that the hydrocarbon-deoxyribonucleoside products formed in BP-treated human bronchial mucosa and mouse skin are indistinguishable from those formed when 7,8-dihydro-7,8-dihydroxybenzo(a)pyrene 9,10-oxide reacts with DNA in solution. These same products were also found in hydrolysates of DNA from mouse skin treated with 7,8-dihydro-7,8-dihydroxybenzo(a)pyrene, but not in hydrolysates of DNA following treatment of mouse skin either with the 4,5- or 9,10-dihydrodiols or with 3-hydroxybenzo(a)pyrene. The results show that the metabolic activation of BP to a diol-epoxide [7,8-dihydro-7,8-dihydroxybenzo(a)pyrene 9,10-oxide] that reacts with DNA is the same in human bronchial mucosa, a tissue in which this hydrocarbon is suspected of being carcinogenic, as it is in mouse skin and in hamster embryo cells, two situations in which BP is known to induce malignancy. (28 references)

4909 OXIDATION OF XENOBIOTICS DURING CHEMICAL CARCINOGENESIS AND EXPERIMENTALLY INDUCED MALIGNANT GROWTH. (Rus.) Poliakov, V. M. (Inst. Chemical Physics, Acad. Sciences USSR, Moscow, USSR); Lapkin, V. Z.; Gurevich, S. M. *Dokl Akad Nauk SSSR* 226(2): 471-473; 1976.

Changes in the oxidation system of xenobiotics were studied in albino mice inoculated sc with 3,4-benzpyrene and albino rats with experimentally induced Ehrlich ascitic carcinoma. Control animals received equivalent amounts of a noncancerous hydrocarbon. The content of cytochromes P-450 and P-448 and the activity of aminopyrine demethylase and 3,4-benzpyrene hydroxylase were determined in the microsomal fraction of the rat liver. The summary content of P-450 and P-448 increased sharply, reaching a maximum level 3 days following injection of the carcinogen. In 2 wk, the cytochrome content reverted to the level found in controls. 3,4-Benzpyrene hydroxylase activity (reflecting the change in P-448 content) changed similarly following injection of the carcinogen, but the growth in activity had a significantly higher amplitude than the growth in absolute cytochrome content. Aminopyrine demethylase activity (reflecting the change in P-450 content) did not change in the early stage of carcinogenesis. Cytochrome content and benzpyrene hydroxylase activity decreased in microsomes of the rat liver during the growth of induced neoplasms, from week 14 of the experiment, while aminopyrine demethylase activity increased sharply.

4910 IMPORTANCE OF MAMMARY GLAND DNA SYNTHESIS ON CARCINOGEN-INDUCED MAMMARY TUMORIGENESIS IN RATS. (Eng.) Nagasawa, H. (Pharmacology Div., Natl. Cancer Center Res. Inst., Tsukiji 5-1-1, Chuo-ku, Tokyo 104, Japan); Yanai, R.; Taniguchi, H. *Cancer Res* 36(7): 2223-2226; 1976.

Mammary tumor incidence has been correlated with mammary gland DNA synthesis; therefore, studies of mammary tumorigenesis in female rats with different degrees of DNA synthesis at the time of carcinogen administration were made. DNA synthesis in the mammary gland (estimated by ^{3}H-thymidine incorporation) was significantly higher on the day of proestrus than on the second day of diestrus in 50-day-old female Sprague-Dawley rats. The percentage of progressive mammary tumors, the tumor growth rate, and the number and weight of tumors per tumor-bearing rat were significantly higher in the animals given a single iv injection of 5 mg 7,12-dimethylbenz(a)anthracene at proestrus than in the animals given the compound at diestrus. Inhibition of DNA synthesis at proestrus by 2-bromo-α-ergocryptine also suppressed mammary tumorigenesis by the carcinogen. In 90-day-old rats in which little difference was found in mammary gland DNA synthesis between proestrus and diestrus, there was no difference in mammary tumorigenesis between animals given the carcinogen at proestrus and diestrus. Prestimulation of mammary gland DNA synthesis by prolactin increased the growth, number, and weight of carcinogen-induced mammary tumors. These results demonstrate the importance of mammary DNA synthesis at the time when a carcinogen acts on the glands in mammary tumorigenesis and suggest that mammary tumor growth potential is largely decided at the initial stages of development. (6 references)

4911 THE 7-METHYLBENZ[a]ANTHRACENE DEOXYRIBONUCLEOSIDE PRODUCTS ISOLATED FROM DNA AFTER METABOLISM OF THE CARCINOGEN BY RAT LIVER MICROSOMES IN THE PRESENCE OF DNA. (Eng.) Thompson, M. H. (Chemical Carcinogenesis Div., Inst. Cancer Res.: Pollards Wood Res. Station, Nightingales Lane, Chalfont St. Giles, Buckinghamshire HP8 4SP, Great Britain); Osborne, M. R.; King, H. W. S.; Brookes, P. *Chem Biol Interact* 14(1/2): 13-19; 1976.

Because the metabolism and covalent binding of certain polycyclic aromatic hydrocarbons to cellular macromolecules may be important in their carcinogenic mechanism, the metabolism of 7-methylbenz[a]anthracene (7MeBA) by 3-methylcholanthrene-induced rat liver microsomes in the presence of added native or denatured DNA was investigated. The reaction resulted in covalent binding of the hydrocarbon to the nucleic acid. Enzymatic degradation and column chromatographic fractionation showed that the hydrocarbon-deoxyribonucleoside products were separable from the products similarly obtained from DNA having 7MeBA bound following the treatment of mouse embryo cells in culture with this hydrocarbon. Comparison of the microsome catalyzed hydrocarbon-deoxyribonucleoside products with those obtained by reaction with the DNA of 7MeBA-5,6-oxide suggested that this K-region epoxide made a significant contribution to the liver microsome-induced DNA binding. (15 references)

4912 INTERACTION OF AROMATIC HYDROCARBONS AND DRUGS WITH ADRENAL MICROSOMAL CYTOCHROME P-450 IN THE GUINEA PIG. (Eng.) Greiner, J. W. (West Virginia Univ. Medical Center, Morgantown, WV 26506); Kramer, R. E.; Robinson, D. A.; Canady, W. J.; Colby, H. D. *Biochem Pharmacol* 25(8): 951-955; 1976.

The addition of simple aromatic hydrocarbons (benzene, ethylbenzene, naphthalene) to guinea pig adrenal microsomes produced typical Type I difference spectra. Spectral dissociation constants (*K*s) for each indicated a higher affinity for adrenal than hepatic cytochrome P-450. Hydrocarbon affinities for adrenal cytochrome P-450 were similar to those for progesterone. Ethylmorphine and aniline produced Type I and Type II spectral changes, respectively, in adrenal microsomes. The *K*s and the magnitude of the spectrum for each in the adrenals was similar to that in livers. Demethylation of ethylmorphine occurred more rapidly in adrenal than hepatic tissue. The Michaelis constants (*K*m) for ethylmorphine metabolism in both tissues were similar. Although the aniline-induced difference spectra in adrenal and hepatic microsomes did not differ substantially, aniline hydroxylase activity was far greater in the liver. Pretreatment of guinea pigs with phenobarbital or 3-methylcholanthrene increased hepatic but not adrenal ethylmorphine metabolism. Spironolactone pretreatment, in contrast, did not affect hepatic metabolism, but significantly lowered adrenal demethylase activity. A relative nonspecificity of guinea pig adrenal microsomal cytochrome P-450 may exist. The adrenal cortex may represent a significant site for the animal's extrahepatic drug metabolism.

4913 MALIGNANT LYMPHOMAS AFTER LONG-TERM HYDANTOIN MANAGEMENT OF EPILEPSY.

(Ger.) Jungi, W. F. (Kantonsspital St. Gallen, CH-9006 St. Gallen, Switzerland); Senn, H. J.; Stanisic, M.; Roesli, R. *Schweiz Med Wochenschr* 105(50): 1735-1737; 1975.

Four patients under hydantoin management of different types of epilepsy for 7, 15, 22, and 23 yr developed three different types of malignant lymphoma. One patient with a well-differentiated, stage III lymphosarcoma after 7 yr of Antisacer remitted completely under chemotherapy but succumbed 3 yr later. A second patient with diffuse, stage II reticulohistiocytic lymphoma after 23 yr of Hidantal survived 3 yr under radiation therapy. Two other patients, one with stage IV diffuse lymphosarcoma and one with Hodgkin's disease, failed to respond to either chemotherapy or radiation and succumbed in 5 and 8 mo, respectively. All probands presented with a 2%-7% eosinophilia, but this was not considered evidence for an allergic drug reaction. The lymphomas failed to regress after hydantoin was discontinued, in contrast to reversible lymphadenopathies.

4914 EXPERIMENTAL BASES OF THE ETIOLOGY OF COLONIC NEOPLASMS.

(Ger.) Wittig, G. (Zentralinstitut fuer Krebsforschung, Akademie der Wissenschaften der DDR, DDR-1115 Berlin-Buch, Lindenberger Weg 80, East Germany); Wildner, G. P. *Zentralbl Chir* 101(7): 395-401; 1976.

The effect of nutrition on colon carcinogenesis was explored in feeding studies of genetically heterogeneous Wistar rats. Dimethylhydrazine (DMH) was injected im once weekly at doses of 5 or 10 mg/kg body wt in either normal (noncolostomized, n-c) or double-colostomized (d-c) animals (left colon immobilized). Four types of diet were studied, including the standard pellet, and the predominantly protein, carbohydrate, and fat feeds; the experimental interval was between 50 and 480 days. (Rats, n-c and d-d, not treated with DMH, were also studied). With standard diets (160-270 days), 45/65 d-c DMH rats (10 mg/kg) developed 67 colon carcinomas, in contrast to 38/45 n-c DMH controls with 77 carcinomatous foci. With the fatty diet (160-240 days) 34 experimental animals (10 mg/kg) presented with 52 frank carcinomas, and 53 controls had 117 malignant foci. Dysplasias were equally divided between the two groups. On the carbohydrate diet (160-270 days), 28/51 experimental rats (10 mg/kg) developed 60 tumors; 49 tumors occurred in 30/42 controls. Sixteen rats had 18 dysplastic foci and 15 had polyps; 11 controls showed 12 dysplasias and 2 polyps. Given the protein diet (160-210 days), 40/43 experimental animals (10 mg/kg) presented with 67 carcinomas, in contrast to 30/47 controls with 52 tumors. Thirteen experimental rats exhibited 14 dysplasias and 7 had polyps, while 15/50 controls had dysplastic foci, but no polyps. A 5-mg/kg weekly dose of DMH (260-350 days) elicited 93 carcinomas in 53/69 d-c animals on the high-protein diet, compared to 169 tumors in 45/77 n-c animals. There were 24 experimental rats with 21 mucosal dysplasias and 7 control rats with 65. Twenty-eight polyps were present in 21 experimental animals and 20 were found in 45 controls. None of the d-c, DMH-free animals were carcinomatous, but one dysplastic focus was found in each of nine rats, while seven had polyps. Of the DMH rats treated longer that 160 days, 66 showed no evidence of tumor, dysplasia, or polyp, suggesting genetic effects. However, 39/327 d-c DMH rats were carcinomatous in the immobilized left colon distal to the colostomy, although the tumors were microscopic in 17 and frank only in 8. Dysplasias, including polyps, are construed as exogenously produced intermediate states of carcinogenesis, requiring further behavioral alteration to elicit tumor formation. (4 references)

4915 PRODUCTION OF INTESTINAL AND OTHER TUMORS BY 1,2-DIMETHYLHYDRAZINE DIHYDROCHLORIDE IN MICE. I. A LIGHT AND TRANSMISSION ELECTRON MICROSCOPIC STUDY OF COLONIC NEOPLASMS.

(Eng.) Toth, B. (Eppley Inst. Res. Cancer, Univ. Nebraska Medical Center, Omaha, NE 68105); Malick, L.; Shimizu, H. *Am J Pathol* 84(1): 69-86; 1976.

Single or 10-weekly sc injection(s) of 1,2-dimethylhydrazine dihydrochloride were administered separately to male and female Swiss albino mice. The repeated application gave rise to high incidences of tumors in the large intestine that occurred most frequently in the colorectal area and in the cecum adjacent to the ileum. These lesions were classified as polypoid adenomas and adenocarcinomas. Most of the adenocarcinomas were highly invasive, although they rarely metastasized. The fine structure of the malignant cells exhibited features typical of columnar absorptive cells. A distinctive alteration was the disorderly arrangement and abnormal size and shape of the microvilli. In addition, the cells exhibited numerous free ribosomes, little rough endoplasmic reticulum, prominent Golgi bodies, and uniformly dispersed nuclear chromatin. Morphologically, the intestinal tumors were similar to those found in man. In addition, the repeated administration of the carcinogen also induced significant incidences of neoplasms in the blood vessels, lungs, anus, and kidneys, and the single application produced tumors in the blood vessels and liver. (27 references)

4916 EFFECT OF N-METHYL-N'-NITRO-N-NITROSOGUANIDINE ON IMMUNE RESPONSE IN RATS IN STOMACH CARCINOGENESIS.

(Eng.) Saito, T. (Second Dept. Surgery, Faculty Medicine, Kyushu Univ., Maidashi 3-1-1, Higashi-ku, Fukuoka 812, Japan); Nomoto, K.; Tamada, R.; Inokuchi, K. *Gann* 67(3): 339-345; 1976.

The immunosuppressive effect of N-methyl-N'-nitro-N-nitrosoguanidine (MNNG) was studied in the stomach of Wistar rats. Injections of the drug sc at 50 mg/kg for 10 days showed a depressed production of hemolysin against sheep RBC in the rats. On the other hand, po administration at 35 mg/kg for 30 wk scarcely suppressed antibody production to heterologous RBC and cell-mediated immune response to Walker-256 carcinosarcoma in the rats during the experimental period of 55 wk. The daily administration po proved to be efficient for the induction of stomach cancer. (36 references)

4917 NUCLEOTIDE ALTERATIONS OF 18S AND 28S RIBOSOMAL RNA FROM RAT LIVER DURING CARCINOGENESIS INDUCED BY N-NITROSOMORPHOLINE. (Ger.)

Huempel, M. (Medizinische Hochschule Luebeck, D-2400 Luebeck 160, West Germany). *Z Krebsforsch* 84(3): 311-323; 1975.

Orthophosphate labeling was used to analyze N-nitrosomorpholine (NNM) effects on ribosomal RNA. Female Wistar rats received 2.5 mCi ^{32}P ip 15 or 24 hr before sacrifice. NNM (10 mg/kg/day) was administered po (in drinking water). The ''moving-up'' technic of high tension paper electrophoresis found a decrease in cytidylic acid-guanylic acid (CG) and uridylic acid-guanylic acid (UG), but no change in adenylic acid-guanylic acid (AG) concentrations. AU + GC and GU + AC remained relatively constant for both 18S and 28S dinucleotide phosphates. The decrease in cytosine phosphate relative to normal cytosine phosphate plus uridine phosphate in the mononucleotide fraction of pancreatic RNAse hydrolysis, and the absence of expected dinucleotide cleavage into mononucleotides argues for the cross-linking of bases. Cytosine is believed to be especially reactive in Schiff base formation with an NNM metabolite; alkylation, hydroxyalkylation, or acylation of bases is ruled out. (28 references)

4918 THE INFLUENCE OF SERUM COMPONENTS ON THE GROWTH AND MUTATION OF CHINESE HAMSTER CELLS IN MEDIUM CONTAINING 8-AZAGUANINE. (Eng.)

Peterson, A. R. (McArdle Lab. Cancer Res., Univ. Wisconsin, Madison, WI 53706); Krahn, D. F.; Peterson, H.; Heidelberger, C.; Bhuyan, B. K.; Li, L. H. *Mutat Res* 36(3): 345-356; 1976.

Such factors as the presence in serum of enzymes that degrade 8-azaguanine (AG), the effects of metabolic cooperation between mutant and nonmutant cells, the number of cell divisions that occur before exposure to AG, and the presence in serum of dialyzable components that interfere with AG toxicity were studied to determine how they interact to affect the growth and mutation of V79 Chinese hamster cells in medium containing AG. Low concentrations ($\leq$20 µg/ml) of AG were a thousand times more toxic to the hamster cells in medium containing 10% dialyzed fetal calf serum (DS) than in medium containing 10% undialyzed serum (US). Serum enzyme activity that converted AG to nontoxic 8-azaxanthine degraded AG at the same rate, whether or not the serum was dialyzed. However, cytotoxicity results similar to those obtained with US were produced in medium containing DS and 2.5 µg of hypoxanthine (HX)/ml (DSH). Therefore, serum HX was considered to be responsible for the relatively low cytotoxicity of AG in medium containing US. Colonies that arose in medium containing AG were isolated and characterized. Those that remained resistant to AG (40 µg/ml) and sensitive to aminopterin in the presence of HX and thymidine (HAT) were considered mutants; nonmutants were sensitive to AG and resistant to HAT. Colonies isolated from medium containing DSH or US and low concentrations of AG were not mutants, but those from medium containing high concentrations ($\geq$30 µg/ml) of AG were mutants. Spontaneous and N-methyl-N'-nitro-N-nitrosoguanidine (MNNG)-induced mutants were detectable in medium containing DSH without replating of the cells prior to addition of AG ($\geq$30 µg/ml), but to detect MNNG-induced mutations in medium containing DS, replating was essential. In DS the mutation frequency increase as an exponential function of the toxicity of MNNG, but remained two orders of magnitude lower than the induced mutation frequencies in DSH. HX, in DSH or US, produced profound effects, other than interferen with AG toxicity, that distorted the results of mutagenesis assays. To study mutation with AG resistance as the endpoint, it is essential to use dialyz serum. (24 references)

4919 TRANSPLANTATION OF CHEMICALLY INDUCED GASTRIC CANCER IN WISTAR RATS. (Eng.)

Hirose, M. (First Dept. Pathology, Nagoya City Univ. Medical Sch., 1 Kawasumi, Mizuho-cho, Mizuho-ku, Nagoya 467, Japan); Takahashi, M.; Hananouchi, M.; Tatematsu, M.; Kinoshita, H.; Fukushima, S.; Ito, N. *Gann* 67(3): 365-367; 1976.

The establishment of a new transplantable adenocarcinoma is reported. Seven of 35 male Wistar rats developed a well-differentiated adenocarcinoma of the glandular stomach on combined treatment with N-methyl-N'-nitro-N-nitrosoguanidine and 4-nitroquinoline 1-oxide. One of the tumors was successful transplanted into newborn Wistar rats by sc inoculation. The latent period after inoculation was less than 1 mo, but the growth of the transplanted tumor was slow throughout 10 transplant generations. The tumor appeared nodular or cystic in the sc tissues and often caused ulceration of the skin. The histology of the transplanted tumors was very similar to that of the primary tumor. Metastasis to both lungs occurred in one rat of the first transplant generation. (20 references)

4920 LEIOMYOSARCOMAS OF THE SMALL INTESTINE INDUCED IN DOGS BY N-METHYL-N'-NITRO-N-NITROSOGUANIDINE. (Eng.)

Koyama, Y. (Natl. Cancer Center, Tsukiji 5-1-1, Chuo-ku, Tokyo 104, Japan); Omori, K.; Hirota, T.; Sano, R.; Ishihara, K. *Gann* 67(2): 241-251; 1976.

Leiomyosarcomas of the small intestine were found in 6 mo old beagles during the experimental induction of gastric carcinoma by oral administration o N-methyl-N'-nitro-N-nitrosoguanidine (MNNG). Ten dogs were given standard diet and 50 µg MNNG/ml drinking water ad libitum for 10 mo; five were fed standard diet mixed with 250 to 500 ml of MNNG sol tion (50 µg/ml water) once or twice a day for 10 m Both groups were then given standard diet and tap water until the end of the experiment. Leiomyosarcomas were found most frequently in the duodenum and jejunum and occasionally in the stomach, but never in the ileum, colon, or rectum. The leiomyosarcomas developed in all the dogs given MNNG in drinking water but not in the dogs fed the standard died mixed with MNNG. Intestinal sarcomas developed in 3 mo to 5 yr after MNNG administration, and they frequently metastasized to the liver and/or the peritoneum. The long latent period indicates that there may be one or more steps between malignant changes of the target cells and the development of malignant tumors. The sarcomas resembled human intestinal leiomyosarcomas in their site of development, histological appearance, and metastases. (14 references)

4921 EFFECT OF PLASTIC BEAD ON GASTRIC CARCINOGENESIS IN RATS TREATED WITH N-METHYL-N'-NITRO-N-NITROSOGUANIDINE. (Eng.) Fukushima, S. (Sch. Medical Technology Nursing, Nagoya Hoken-Eisei Univ., Dengakugakubo, Kutsukake-cho, Toyoake, Aichi-ken 470-11, Japan); Hananouchi, M.; Shirai, T.; Tatematsu, M.; Hirose, M.; Yoshida, S.; Takahashi, M. *Gann* 67(2): 197-205; 1976.

Experiments were made on the induction of cancer of the glandular stomach in male Wistar rats by a combination of oral administration of 100 mg/l N-methyl-N'-nitro-N-nitrosoguanidine (MNNG) in the drinking water for 26 wk, and insertion of a plastic bead into the gastric lumen. (The bead was made of a methacrylate resin; it was 1 cm in diameter and weighed 550 mg). The incidence of cancer with this combination was greater than with MNNG alone. Fluoroscopic examination showed that barium sulfate remained in the stomach longer with the bead present, indicating that MNNG must have remained in the stomach longer, increasing the period of exposure of the gastric mucosa to the carcinogen. Pyloric metaplasia lesions were found in the fundic region of the glandular stomach of rats treated with the carcinogen, with or without the bead, raising the question of the relationship of these types of lesions to gastric cancer. (17 references)

4922 THE REACTIVITY AND TOXICITY OF CYCLIC SULFURIC ACID ESTERS. (Ger.) Fischer, G. W. (Forschungsstelle fuer chemische Technologie, Akademie der Wissenschaften der DDR, DDR-701 Leipzig, Johannisallee 20, East Germany); Jentzsch, R.; Kasanzewa, V. *J Prakt Chem* 317(6): 943-952; 1975.

The alkylating potential, hydrolysis pattern, and acute toxicity of 1,2-ethylene sulfate (I), 1,3-propylene sulfate (II), and 1,3-butylene sulfate (III) were analyzed. Eight mice per group received 0.1 ml of agent in sunflower oil per 10 g of body wt ip. he LD_{50} of I was 26 mg/kg, of II 135 mg/kg, and of III 190 mg/kg. Alkylating and hydrolytic values, espectively, were 315 and 261 for I, 1.6 and 20 for I, and 0.36 and 39 for III. Under the same conditions, the LD_{50} for dimethylsulfate was 61 mg/kg and or diethylsulfate 220 mg/kg. Acute toxicity varies irectly with the alkylating and hydrolytic values. 21 references)

4923 ACUTE MYELOMONOCYTIC LEUKAEMIA AND MULTIPLE MYELOMA AFTER SULPHINPYRAZONE AND COLCHICINE TREATMENT OF GOUT. (Eng.) Witwer, M. W. (Dept. Medicine, Northwestern Univ. Medical Centre, 303 E. Chicago Ave., Chicago, IL 60611); Schmid, F. R.; Tesar, J. T. *Br Med J* 2(6027); 89; 1976.

Evidence is cited that links sulphinpyrazone and possibly colchicine with the development of blood dycrasias. Three fatal blood dycrasias (two acute myelomonocytic leukemias and one multiple myeloma) occurred in 25 patients with gout who took sulphinpyrazone for 2.8-14 yr and colchicine intermittently for shorter periods. Sulphinpyrazone, which is chemically related to certain leukemogenic drugs, initially causes marrow depression, thus providing the basis for dycrasia development. Colchicine may act synergistically with sulphinpyrazone. Patients with gout being treated with these drugs should receive careful hematological evaluation. (5 references)

4924 MECHANISM OF SUPPRESSIVE EFFECT OF BASIC CUPRIC ACETATE ON RAT LIVER CARCINOGENESIS BY ETHIONINE. (Eng.) Yamane, Y. (Faculty Pharmaceutical Sciences, Chiba Univ., Yayoicho 1-33, Chiba 280, Japan); Sakai, K.; Kojima, S. *Gann* 67(2): 295-302; 1976.

This study was made to determine the direct interaction in vivo of copper with the ethylation process in specific tRNA of the liver. The ethylation rate of tRNA by L-ethionine (ethyl-1-^{14}C) was markedly lower in the liver of male Wistar rats fed a diet containing copper than in that of controls. Incorporation of the labeled compound into the tRNA of liver by a single injection of L-ethionine(ethyl-1-^{14}C) was inhibited as much as 50% by the preceding administration of copper and ethionine added concurrently in the diet. Direct interaction of the copper ion with the ethylation process was deemed an important biochemical explanation (at the molecular level) of the inhibitory mechanism of copper on rat liver carcinogenesis by ethionine. Profiles of normal tRNA on methylated albumin-kieselguhr column chromatography revealed three components for leucine, two of which were found at tube number 40 to 50, in which the radioactivity of the ethylated tRNA labeled by ethionine was concentrated, and disappeared in the leucyl tRNA treated with ethionine. The components for leucine that disappeared were normalized in the liver of rats by the concurrent administration of copper. (42 references)

4925 SARCOMA AFTER INTRAMUSCULAR IRON INJECTION (Letter to Editor). (Eng.) Metcalfe, J. B. (Telford, Salop, England). *Br Med J* 2(6029): 233-234; 1976.

Previous experiments indicating a possible association between im iron injections and sarcoma of the buttock are questioned in terms of lack of supporting evidence. Although iron-treated patients accounted for 4% of a series of 90 sarcomas of the buttock, the number of controls treated with iron injections is not indicated. The incidence of sarcoma in iron-injected patients and the incidence of sarcoma in controls are likewise not provided. The reliability of evidence pointing to the close spatial association between the injection site and the sarcoma is also questioned in view of an admitted lack of records, the disparity of volumes between the buttock and the injection bolus, and the patient's memory of the location of an injection after an interval of years as well as his inevitable ignorance of the depth and direction of the needle point from the skin puncture. (No references)

4926 SARCOMA AFTER INTRAMUSCULAR IRON INJECTION (Letter to Editor). (Eng.) Greenberg, G. (Committee on Safety of Medicines, London, EC2, England). *Br Med J* 2(6029): 234; 1976.

A possible association between sarcoma of the buttock and im iron injection is mentioned with the hope of bringing other cases to light. Four of 90 patients with sarcoma of the buttock whose drug histories were available for study had received im injections of iron into the buttock. In assuming a relationship, it must be supposed that the percentage of iron users in these patients (more than 4%) does not differ from that in the general population. This would mean that as many as 2 million patients in the United Kingdom have at some time received a course of iron injections into the buttock; this latter possibility, however, seems unlikely. (No references)

4927 COMPARISONS OF CARCINOGENICITIES OF NICKEL COMPOUNDS IN RATS. (Eng.) Sunderman, F. W., Jr. (Dept. Lab. Medicine, Univ. Connecticut Sch. Medicine, P. O. Box G, Farmington, CT 06032); Maenza, R. M. *Res Commun Chem Pathol Pharmacol* 14(2): 319-330; 1976.

Additional evidence of marked differences in the carcinogenicities of relatively insoluble nickel compounds is furnished in this study. The authors compared the incidences of sarcomas in Fischer rats within 2 yr after a single im injection of four insoluble nickel-containing powders: amorphous nickel monosulfide (NiS), nickel subsulfide (αNi_3S_2), partially converted nickel-iron sulfide matte, and metallic nickel. The powders (< 2 μm median particle diameters) were administered in penicillin suspension, and each powder was tested at two dosages. αNi_3S_2 was highly carcinogenic but amorphous NiS did not induce any tumors. The carcinogenic potency of the partially converted nickel-iron sulfide matte was less than αNi_3S_2 but greater than Ni powder. No sarcomas occurred at the injection site in two groups of control rats that received im injections of penicillin or Fe powder. The observed differences in the carcinogenic potencies of αNi_3S_2 and amorphous NiS may provide an experimental approach to elucidate the molecular mechanisms of nickel carcinogenesis. (18 references)

4928 TECHNIQUES FOR MEASURING THE TOXIC EFFECTS OF CHEMICAL POLLUTANTS IN WATER. (Eng.) Kool, H. J. (No affiliation given). *Trib Cebedeau* 28(383): 348-358; 1975.

4929 PREDICTING THE RISK OF TUMOR OCCURRENCE UNDER THE EFFECT OF SMALL DOSES OF CARCINOGENS. (Eng.) Yanysheva, N. Y. (Scientific Res. Inst. General and Communal Hygiene, Kiev, USSR); Antomonov, Y. G. *Environ Health Perspect* 13: 95-99; 1976.

4930 RETROSPECTIVE STUDY OF 236 FORMER ASBESTOS TEXTILE WORKERS IN HAMBURG. (Ger.) Hain, E. (Allg. Krankenhaus Hamburg-Harburg, D-2100 Hamburg 90, Eissendorfer Pferdeweg 52, West Germany); Hinz, I.; Dalquen, P. *Int Arch Occup Environ Hlth* 36(2): 119-136; 1975.

4931 THE SIGNIFICANCE OF FIBROUS DUST ON HEALTH AND THE MEASUREMENT OF ITS EFFECT. (Ger.) Schlipkoeter, H.-W. (Medizinisches Institut fuer Lufthygiene und Silikoseforschung, Univ. Dusseldorf, Dusseldorf, West Germany); Friedrichs, K.-H. *Klima+ Kalte Ingenieur* 3(11): 359-362; 1975. (No references)

4932 RADIATION BIOCHEMICAL ACTIVATION OF CARCINOGENS AND THE POSSIBLE ROLE OF O_2^- (Meeting Abstract). (Eng.) Greenstock, C. L. (Medical Biophysics Branch, Atomic Energy Canada Ltd., Whiteshell Nuclear Res. Establishment, Pinawa, Manitoba, Canada ROE 1LO); Ruddock, G. W. *Radiat Res* 67(3): 531-532; 1976.

4933 COMPARATIVE ORIENTATION OF THE FLUORENE RESIDUE IN NATIVE DNA MODIFIED BY N-ACETOXY N-2-ACETYLAMINOFLUORENE AND TWO 7-HALOGENO DERIVATIVES. (Eng.) Fuchs, R. P. (Institut de Biologie Moleculaire et Cellulaire, Groupe de Biophysique, 67000 Strasbourg, France); Lefevre, J.-F.; Pouyet, J.; Daune, M. P. *Biochemistry* 15(15): 3347-3351; 1976.

4934 NEW ALDEHYDE DEHYDROGENASE ISOZYMES IN CHEMICALLY INDUCED LIVER TUMORS IN THE RAT. (Eng.) Feinstein, R. N. (Div. Biological and Medical Res., Argonne Natl. Lab., Argonne, IL 60439); Fry, R. J.; Cameron, E. C.; Peraino, C.; Morris, H. P. *Proc Soc Exp Biol Med* 152(3): 463-468; 1976.

4935 POLYCYCLIC ARYLOXIRANES: A NEW CLASS OF CARCINOGENS. (Eng.) Harvey, R. G. (Ben May Lab. for Cancer Res., Univ. Chicago, Chicago, IL 60637); Pataki, J.; Wilke, R. N.; Flesher, J. W.; Soedigdo, S. *Cancer Lett (Amsterdam)* 1(6): 339-344; 1976.

4936 THE SYNTHESIS OF SPECIFIC PROTEINS IN ADULT MOUSE EPIDERMIS DURING PHASES OF PROLIFERATION AND DIFFERENTIATION INDUCED BY THE TUMOR PROMOTER TPA, AND IN BASAL AND DIFFERENTIATING LAYERS OF NEONATAL MOUSE EPIDERMIS. (Eng.) Balmain, A. (Inst. Experimental Pathology, German Cancer Res. Centre, 6900 Heidelberg, Im Neuenheimer Feld 280, West Germany). *J Invest Dermatol* 67(2): 246-253; 1976.

4937 HEPATIC ARYL HYDROCARBON HYDROXYLASE ACTIVITY IN IRRADIATED MICE (Meeting Abstract). (Eng.) Prasad, N. (Baylor Coll. Medicine, Houston, TX 77025); Prasad, R.; Bushong, S. C.; North, L. B. *Radiat Res* 67(3): 571; 1976.

4938 CELLULAR BINDING OF BENZO(a)PYRENE TO DNA CHARACTERIZED BY LOW TEMPERATURE FLUORESCENCE. (Eng.) Ivanovic, V. (Inst. Cancer Res., Columbia Univ. Coll. Physicians and Surgeons, New York, NY 10032); Geacintov, N. E.; Weinstein, I. B. *Biochem Biophys Res Commun* 70(4): 1172-1179; 1976.

4939 CHARGE LOCALIZATION IN THE CARBONIUM IONS OF METHYLBENZANTHRACENES. (Eng.) Cavalieri, E. (Eppley Inst. for Res. in Cancer, Univ. Nebraska Medical Center, Omaha, NB 68105); Calvin, M. *J Org Chem* 41(16): 2676-2679; 1976.

4940 DETECTION AND ESTIMATION OF AZOMETHANE IN EXPIRED AIR OF 1,2-DIMETHYLHYDRAZINE-TREATED RATS. (Eng.) Fiala, E. S. (Naylor Dana Inst. Disease Prevention, American Health Foundation, Valhalla, NY 10595); Kulakis, C.; Bobotas, G.; Weisburger, J. H. *J Natl Cancer Inst* 56(6): 1271-1273; 1976.

4941 COMPARISON OF TUMOR SUSCEPTIBILITY AMONG VARIOUS ORGANS OF FOETAL, YOUNG AND ADULT ICR/JCL MICE. (Eng.) Nomura, T. (Dept. Medical Genetics, Lab. Genetics, Univ. Wisconsin, Madison, WI 53706). *Br J Cancer* 33(5): 521-534; 1976.

4942 PULMONARY EFFECTS OF CHRONIC EXPOSURE TO AIRBORNE CADMIUM. (Eng.) Smith, T. J. (Div. Environmental and Occupational Health, Dept. Family and Community Medicine, Univ. Utah Medical Center, Salt Lake City, UT 84132); Petty, T. L.; Reading, J. C.; Lakshminarayan, S. *Am Rev Respir Dis* 114(1): 161-170; 1976.

4943 PROLACTIN CONCENTRATIONS IN RAT TISSUES (Meeting Abstract). (Eng.) Cole, E. N. (Welsh Natl. Sch. Medicine, Heath Park, Cardiff, CF4 4XX, Wales); Baker, K. *J Endocrinol* 67(2): 52P; 1975.

4944 THE EFFECT OF DIETHYLSTILBESTROL ON THE PRENATAL DEVELOPMENT OF CHICK MULLERIAN DUCT (Meeting Abstract). (Eng.) Teng, C. S. (Dept. Cell Biology, Baylor Coll. Medicine, Houston, TX 77025); Teng, C. T. *J Cell Biol* 70(2/Part 2): 145a; 1976.

4945 THE FATE OF DIETHYLSTILBESTROL IN THE PREGNANT MOUSE. (Eng.) Shah, H. C. (Environmental Toxicology Branch, Natl. Inst. Environmental Health Sciences, P.O. Box 12233, Research Triangle Park, NC 27709); McLachlan, J. A. *J Pharmacol Exp Ther* 197(3): 687-696; 1976.

4946 SIDE EFFECTS OF RHEUMATOIDSUPPRESSIVE SHOCK THERAPY FOR CHRONIC POLYARTHRITIS. COMPARISON OF SYSTEMIC AND LOCAL ADMINISTRATION. (Ger.) Chlud, K. (Kaiser-Franz-Joseph-Spital, Kundratstrasse 3, A-1100 Vienna, Austria). *Acta Med Austriaca* 2(4): 140-144; 1975.

4947 EFFECT OF SELENIUM ON IMMUNOSUPPRESSIVE AND TERATOGENIC PROPERTIES OF AFLATOXIN B_1. (Eng.) Aleksandrowicz, J. (Hematological Clinic, Inst. Internal Medicine, Medical Acad., Dept. Animal Physiology, Inst. Zoology, Jagiellonian Univ., Cracow, Poland); Dobrowolski, J.; Lisiewicz, J. *Rev Esp Oncologia* 22(2): 239-247; 1975.

4948 AFLATOXIN CONTAMINATION, FLUORESCENCE, AND INSECT DAMAGE IN CORN INFECTED WITH *ASPERGILLUS FLAVUS* BEFORE HARVEST. (Eng.) Lillehoj, E. B. (Northern Regional Res. Lab., Agricultural Res. Service, U. S. Dept. Agriculture, Peoria, IL 61604); Kwolek, W. F.; Peterson, R. E.; Shotwell, O. L.; Hesseltine, C. W. *Cereal Chem* 53(4): 505-512; 1976.

4949 EFFECTS OF CHOLERA TOXIN ON INTRAMEMBRANOUS PARTICLES AND MITOCHONDRIA IN A MURINE LYMPHOID CELL LINE (Meeting Abstract). (Eng.) Zuckerman, S. H. (Depts. Medicine and Microbiology, Univ. Minnesota Medical Sch., Minneapolis, MN 55455); Ooka, M. P.; Douglas, S. D. *J Cell Biol* 70(2/Part 2): 234a; 1976.

4950 CYTOPHOTOMETRIC MEASUREMENTS OF NUCLEAR FEULGEN DNA IN IN VIVO AND IN VITRO NORMAL, WOUND AND CROWN GALL TUMOR TISSUES OF *NICOTIANA TABACUM L.* (Meeting Abstract). (Eng.) De Cleene, M. (Lab. Microbiology, State Univ., Ledeganckstraat 35, 9000 Gent, Belgium); De Ley, J. *J Cell Biol* 70(2/Part 2): 225a; 1976.

4951 MUTAGENICITY OF 5-NITROACENAPHTHENE IN SALMONELLA. (Eng.) Yahagi, T. (Biochemistry Div., Natl. Cancer Center Res. Inst., Tsukiji 5-1-1, Chuo-ku, Tokyo 104 Japan); Shimizu, H.; Nagao, M.; Takemura, N.; Sugimura, T. *Gann* 66(5): 581-582; 1975.

4952 DNA CONTENT OF CULTURED MAMMALIAN CELLS EXPOSED TO SMOKE AND SMOKE FRACTIONS FROM CIGARETTES CONTAINING TOBACCO OR NSM, A TOBACCO SUBSTITUTE. (Eng.) Styles, J. A. (Imperial Chemical Industries Ltd., Central Toxicology Lab., Alderley Park, Macclesfield, Cheshire, England). *Br J Exp Pathol* 57(3): 286-295; 1976.

4953 N-NITROSOPYRROLIDINE COLLECTED AS A VOLATILE DURING HEAT-INDUCED FORMATION IN NITRITE-CONTAINING PORK. (Eng.) Warthesen, J. J. (Dept. Food Science and Nutrition, Univ. Minnesota, St. Paul, MN 55108); Bills, D. D.; Scanlan, R. A.; Libbey, L. M. *J Agric Food Chem* 24(4): 892-894; 1976.

4954 EFFECTS OF BUTYLATED HYDROXYTOLUENE TREATMENT UPON SURVIVAL AND CARCINOGENESIS AFTER X-RAYS OR DIETHYLNITROSAMINE (Meeting Abstract). (Eng.) Clapp, N. K. (Biology Div., Oak Ridge Natl. Lab., Oak Ridge, TN 37830); Satterfield, L. C; Klima, W. C. *Radiat Res* 67(3): 571; 1976.

4955 LONG-TERM EFFECT OF SHOYU (JAPANESE SOY SAUCE) ON THE GASTRIC MUCOSA OF THE RAT. (Eng.) MacDonald, W. C. (Dept. Medicine, Univ. British Columbia, Vancouver, British Columbia, Canada); Dueck, J. W. *J Natl Cancer Inst* 56(6): 1143-1147; 1976.

4956 CELL SURFACE CHANGES IN NORMAL AND MNU-TREATED RAT BLADDERS IN VIVO AND IN VITRO, AND IN BLADDER RECOMBINANTS IN VITRO. (Meeting Abstract). (Eng.) Hodges, G. M. (Imperial Cancer Res. Fund, WC2, England); Hicks, R. M. *J Cell Biol* 70(2/ Part 2): 215a; 1976.

See also:

* (Rev): 4801, 4802, 4803, 4804, 4805, 4806, 4807, 4808, 4809, 4810, 4811, 4812, 4813, 4814, 4815, 4816, 4819, 4830, 4851, 4852, 4854, 4855, 4859, 4860
* (Phys): 4982
* (Viral): 5034, 5089
* (Immun): 5105, 5118, 5119, 5122, 5130, 5133
* (Path): 5168, 5175, 5183, 5191, 5192, 5193, 5211, 5225, 5226, 5237, 5239, 5265
* (Epid-Biom): 5274, 5280, 5281, 5282, 5283, 5284, 5285, 5286, 5287, 5288, 5293, 5299, 5300, 5315, 5330, 5331

4957 CONCLUSIONS OF THE BEIR AND UNSCEAR REPORTS ON RADIATION EFFECTS PER MAN-REM.

(Eng.) Cohen, B. L. (Univ. Pittsburgh, Pittsburgh, PA 15260). *Health Phys* 30(4): 351-352; 1976.

The derivation of values representing the number of cancer deaths per man-rem and the number of genetic defects per man-rem, which were published in the BEIR and UNSCEAR reports, are clarified. From the conclusion in the BEIR report that an additional exposure of the U.S. population of 5 rem/30 yr would cause approximately 6,000 cancer deaths annually, the number of cancer deaths per man-rem is calculated to be 180 x 10^{-6}. According to the linearity hypothesis, this figure applies to accidents involving a single large radiation exposure as well as to chronic exposure. The number of genetic defects per man-rem is calculated to be 160 x 10^{-6}.

4958 CYTOGENETIC ACTION OF EXTRACTS FROM γ-IRRADIATED POTATO TUBERS ON THE BONE MARROW OF MICE.

(Rus.) Kuzin, A. M. (Inst. Biological Physics, Acad. Sciences USSR, Pushchkino, USSR); Osipova, I. N.; Kopylov, V. A. *Radiobiologiia* 15(5): 763-766; 1975.

Radiotoxins isolated from γ-irradiated (10 krad) potato tubers were administered to 4 groups of 10 male white mice each. Group I (experimental) received the extract po from irradiated potatoes, Group II (first control) received a similarly isolated extract from a nonirradiated potato, group III (second control) received a physiologic solution, and group IV (positive control) was subjected to one-time γ-irradiation in a dose of 125 rad. Extracts from irradiated potato tubers caused a statistically significant increase in the number of cells with chromosomal aberrations. The 19.63% incidence of aberrations (bridges and fragments) observed in the bone marrow cells of group I animals exceeded the percentages of aberrant cells in groups II (5.01%) and III (3.19%). In view of the finding of 43.90% aberrant cells in group IV animals, the effect obtained from introduction of the extract from irradiated potato tubers is considered equivalent to approximately 60 rad of general irradiation. In addition to chromosomal aberrations, certain cytogenetic disorders, namely, attached chromosomes and retarded chromosomes in the anaphase, were observed in the bone marrow cells.

959 NEOPLASTIC AND LIFE-SPAN EFFECTS OF CHRONIC EXPOSURE TO TRITIUM. II. RATS EXPOSED IN TERO.

(Eng.) Cahill, D. F. (Natl. Environmental es. Center, Research Triangle Park, NC 27711); right, J. F.; Godbold, J. H.; Ward, J. M.; Laskey, . W.; Tompkins, E. A. *J Natl Cancer Inst* 55(5): 165-1169; 1975.

he effects on neoplasia incidence and life-span of xposure in utero to a major environmental radionulide were determined. Sprague-Dawley rats were ontinuously exposed to tritiated water (HTO) from onception through birth (in doses of 0, 1, 10, 50, nd 100 μCi HTO/ml body water). HTO administration as terminated at birth. Calculated cumulative doses during gestation were about 0, 6.6, 66, 330, and 660 rads of total body irradiation. The two highest doses resulted in sterile offspring. Animals surviving through 30 days postnatally were defined as the study population and observed until their deaths. Intrauterine exposures to doses up to 65 rads had no significant effects on either sex (with respect to life-span, overall neoplasia incidence, incidence rate, on onset of mammary fibroadenomas). Females exposed to 330 or 660 rads were sterile and had lower incidence rates of mammary fibroadenomas than did controls; at 660 rads, females had a lower incidence of overall neoplasia and reduced mean life-spans. Regardless of dose group, females had significantly higher incidences of neoplasia and longer life-spans than males.

4960 ASSOCIATION OF PLUTONIUM WITH ISOLATED LIVER PARENCHYMAL CELLS FOLLOWING INJECTION OF MONOMERIC PLUTONIUM INTO MICE.

(Eng.) Bhattacharyya, M. H. (Div. Biological and Medical Res., Argonne Natl. Lab., Argonne, IL 60439); Lindenbaum, A. *Radiat Res* 66(3): 552-565; 1976.

The early kinetics of the association of plutonium with liver parenchymal cells was measured after iv injection of monomeric plutonium $[^{239}Pu(IV)citrate]$ into female CF1 mice. The amount of plutonium associated with isolated liver parenchymal cells and the total liver plutonium concentration were determined 1 hr-6 days after plutonium administration. The number of parenchymal cells per gram of mouse liver as well as the ratios of parenchymal cell-associated plutonium (DPM/isolated cell) to total plutonium concentration (DPM/g liver) were calculated to determine the percentage of the liver burden associated with parenchymal cells. Up to 6 days, the concentration of monomeric plutonium associated with isolated mouse liver parenchymal cells increased more slowly than the total liver plutonium concentration. The latter reached a maximum by 5 hr and decreased only slightly by 6 days. In contrast, the fraction of the liver burden associated with parenchymal cells increased from 29% at 5 hr to 70% at 6 days after plutonium administration. (13 references)

4961 SOLUBILITY OF SOME THORIUM-CONTAINING SUBSTANCES IN MEDIA IMITATING PHYSIOLOGICAL FLUIDS.

(Rus.) Pavlovskaia, N. A. (Scientific-Res. Inst. Industrial Hygiene and Occupational Diseases, Acad. Medical Sciences USSR, Moscow, USSR); Liarskii, P. P.; Mal'tseva, M. M.; Goncharova, A. M. *Gig Sanit* (2): 112-114; 1976.

The solubility of thorium dioxide (ThO_2) and the leaching of its daughter radionuclides (^{228}Th, ^{224}Ra, and ^{212}Pb) were investigated in media imitating physiologic fluids. ThO_2 solubility was 0.8 x 10^{-4} g in 1,000 ml of distilled water, a slightly higher value than indicated in the literature. The values for its solubility in a 0.22% sodium carbonate solution, 0.3% HCl, a physiological saline, and gastric juice at 37 C were 0.7 x 10^{-4}, 3.6 x 10^{-4}, 0.9 x 10^{-4}, and 0.9 x 10^{-4} g/liter. The data suggest that titanium and Th would be resorbed from deposits into the blood in equivalent amounts. Zirconium was absorbed into the sodium carbonate solution in amounts not exceeding 0.0042% and into the 0.3% HCl in amounts up to 0.02%. The leaching level of ^{232}Th in the given media could not be determined. Leaching of the daughter radionuclides in media imitating physiologic fluids was significantly greater than that of the mother radionuclide.

4962 SO-CALLED FIBROUS LONG-SPACING COLLAGEN IN A MURINE OSTEOSARCOMA. (Ger.) Marquart, K.-H. (Abt. f. Allg. u. Exp. Pathologie, Gesellschaft fuer Strahlen- und Umweltforschung mbH Munchen, D-8042 Neuherberg, West Germany); Luz, A.; Goessner, W. *Virchows Arch* [*Pathol Anat*] 370(2): 177-183; 1976.

An unusual intercellular material, only detectable by electron microscopy, was found in 1/28 male NMRI mice with osteocarcinomas in the proximal humerus. The animal was 5-8 wk old and had received twice weekly ip injections of ^{224}Ra (1.5 μCi/hg). The cherry-sized tumor was found 19 mo after the experiment began. It was moderately firm and of a striking dark-red hue. Light microscopy found a cell-rich, poorly differentiated invasive mass that had eroded the cortex. Numerous sinusoidal vascular spaces and argyrophil fibers were seen, but there was little collagen or evidence of bone formation. Electron microscopy showed a predominantly polymorphonuclear cell with a well-developed rough endoplasmic reticulum. There was very little intercellular collagen. Instead, the intercellular space was filled with an amorphous, electron-dense material with occasional spindle- or band-shaped structures on which cross-striations periodically occurred. The structures consisted of long and nearly parallel filaments, the staining of which was weaker than that of typical procollagen. The alternating light and dark bands, or cross-striations, were broader and their periodicity was longer than those for collagen. The electron density of the bandwidth was 35-50 nm, and the periodicity was 85-100 nm. Microfilaments 10-20 nm thick and without striations (resembling procollagen) were always localized near the bundles of striated filaments. There was no obvious relation between striated filaments and sinusoids or capillaries. Intracisternal type A virus particles were found in a few tumor cells. (18 references)

4963 TUMOR AND INJURY RESPONSES OF RAT SKIN AFTER SIEVE PATTERN X IRRADIATION. (Eng.) Albert, R. E. (Inst. Environmental Medicine, New York Univ. Medical Center, 550 First Ave., New York, NY 10016); Burns, F. J. *Radiat Res* 67: 142-148; 1976.

The dorsal skin of 261 male albino CD rats was irradiated with low voltage x-ray exposures of 1,200 or 2,000 R in a uniform pattern and in sieve patterns with pore diameters of 0.5 or 1.6 mm. Exposure was at 58 days of age when the hair was in the resting phase. The tumor yield was markedly reduced by the sieve pattern exposure, particularly with the 0.5-mm pore size, but there was no associated sieve effect on the occurrence of hair follicle damage. When the relatively small radiation exposure of 670 R was administered to the skin between the sieve holes, the sieve effect was largely abolished. The results of this and previous studies suggest that the sieve effect occurs with low linear energy transfer radiation and may represent a delay in the time of tumor occurrence. (6 references)

4964 PECULIARITIES OF REGENERATION OF THE BONE MARROW OF MICE IRRADIATED WITH SUBLETHAL DOSES. (Rus.) Barakina, N. F. (Inst. Developmental Biology, Acad. Sciences USSR, Moscow, USSR). *Radiobiologiia* 15(5): 657-661; 1975.

The origin and function of x-cells, lymphocyte-like cellular elements identifiable by electron microscopy in the bone marrow of irradiated mice during regeneration, and their participation in the post-irradiation restoration of hemopoiesis were studied. C_{57}Bl/Rij mice aged 7-8 wk received 400 rads, and counterparts aged 11-13 vk received 800 rads. When regenerating bone marrow containing a maximum amount of x-cells was administered iv to mice receiving LD irradiation, the amount of colony-forming units in the spleen was less than in experiments with normal bone marrow. Similar results were obtained in vitro. The results of a cytologic investigation of myelograms of the bone marrow of irradiated mice during restoration indicated that the kinetics of regeneration of erythroid and myeloid populations is not dpeendent upon x-cell accumulation. X-cells are not precursors of granulocytic and erythroid cells but are thymus-independent lymphocytes or their embryonic precursors.

4965 OVARIAN TUMORIGENESIS AFTER WHOLE BODY X-RAY IRRADIATION IN DDY/F AND C3H/TW MICE. (Eng.) Komuro, M. (Zoological Inst., Faculty Science, Univ. Tokyo, Bunkyo, Tokyo 113, Japan). *J Radiat Res (Tokyo)* 17(2): 99-105; 1976.

Ovarian tumorigenesis was studied in ddY/F and C3H/Tw mice up to 18 mo after whole body irradiatio at 2 wk of age with a single dose of 130 R or 260 R of x-rays. The first ovarian tumors were observed a 9 mo in ddY/F mice. In a total of 28 of 71 ddY/F mice, 33 ovarian tumors developed, which included 2 luteomas, 4 granulosa-cell tumors, 1 mixed cell tumor, and 3 tubular adenomas. In contrast, 21 of 2 C3H/Tw mice had 32 tubular adenomas and 1 mixed cel tumor. After about 12 mo, small interstitial cells resembling luteoma cells and containing eosinophili cytoplasm were observed in irradiated ovaries. The results suggest that luteomas may be derived from the small interstitial cells. (12 references)

4966 CYTOPLASMIC EFFECTS OF X-IRRADIATION ON CULTURED CELLS IN A NONDIVIDING STAGE. 1. ESTABLISHMENT OF AN EXPERIMENTAL MODEL. (Eng.) Hamberg, H. (Sabbatsberg's Hosp., Karolinska Institute Medical Sch., 82 Stockholm, Sweden); Brunk, U. T.; Ericsson, J. L. E.; Jung, B. *Acta Pathol Microbiol Scand* [*A*] 84(2): 201-214; 1976.

The sequential development of radiation-induced damage of interphase cells (human glial cells) was investigated, and earlier studies reviewed. Definit alterations, typically consisting of cytoplasmic and nuclear condensation, were seen in cells receiving 5,000 rads or more from an 8-MeV linear accelerator. Many cells also formed slender cytoplasmic projections crossing neighboring cells. The occurrence of these changes increased as the dose increased. In cells receiving 5,000-10,000 rads, ultrastructural modifications were present from 12 hr postirradiation. During the first 2-3 days, the changes were characterized by an increased number of autophagic vacuoles containing recognizable cytoplasmic organelles such as mitochondria and endoplasmic reticulum. During the next 2-3 days, there was a steady increase in the amount of dense residual-type bodies. At a 20,000-rad dose level the earliest signs of ultrastructural modifications were seen about 5 hr postirradiation, and the residual body formation was fully developed by day 4. Other cytoplasmic changes that occurred partly resembled the normal ''aging'' processes observed in cultured glial cells. It was concluded that x-irradiation induces increased autophagy followed by large scale accumulation of residual bodies in the cells. (47 references)

4967 DEVELOPMENT OF ADENOCARCINOMA OF THE PROSTATE IN ICR MICE LOCALLY IRRADIATED WITH X-RAYS. (Eng.) Hirose, F. (Dept. Cancer Res., Res. Inst. Nuclear Medicine and Biology, Hiroshima Univ., Kasumi 1-2-3, Hiroshima 734, Japan); Takizawa, S.; Watanabe, H.; Takeichi, N. *Gann* 67(3): 407-411; 1976.

The pelvic region of male ICR/JCL mice 5-7 wk of age was irradiated with 1,000 rads of x-rays for a total of eight exposures (total, 8,000 rads) to determine whether prostatic carcinoma would be induced. Prostatic adenocarcinoma was observed in 5 of 135 animals that survived more than 12 wk after the first x-irradiation. Because the spontaneous development of prostatic adenocarcinoma has not been reported in mice, its development here can be attributed to x-irradiation. (22 references)

4968 THE TRICHO SYSTEM: HYPERTRICHOSIS, RADIATION, AND CANCER. (Eng.) Lapidus, S. M. (Dept. Surgery, Div. Plastic Surgery, Milton S. Hershey Medical Center, Hershey, Pennsylvania State Univ., Hershey, PA 17033). *J Surg Oncol* 8(3): 267-274; 1976.

Five women 64-81 yr of age who had been treated 30-40 yr previously for facial hypertrichosis were examined. The epilations had been performed with an x-ray device called Tricho system. The beauty shop operator who administered these treatments may or may not have received instruction by the company in the operation of the equipment. At varying intervals, each of the five women developed radiodermatitis and basal cell and/or squamous cell carcinoma at the sites of epilation. Two underwent massive radical resective surgery, two required extensive exciion and resurfacing, and one refused resective urgery although she had had a previous surgical ttempt 17 yr earlier. This series is representative f the epidemic nature of Tricho-system-induced isease. (16 references)

4969 THE GONADAL LOAD DURING RADIATION THERAPY OF BENIGN DISEASES. 1. DEGENERATIVE ARTHROPATHIES. (Ger.) Nuesslin, F. (Medizinische Hochschule Hannover, Abteilung Strahlentherapie, 3000 Hannover 61, Karl-Wiechert-Allee 9, West Germany); Hassenstein, E. *Strahlentherapie* 151(5): 409-416; 1976.

The gonadal radiation load in males and females under radiation management of four types of degenerative arthropathy was assayed. Measurement was by thermoluminescent (LiF) dosimetry with an Alderson phantom. Three different methods of radiation (250 kV) were used, and only the homolateral ovaries were involved. In humeroscapular periarthritis, the ovarian and testicular doses were approximately 0.0001% of the surface exposure. In spondylitis deformans, up to 30% of the surface dose reached the ovarian level in contrast to about 1% for the testes. Approximately 30% was found in the ovary and 3%-7% in the testes during hip arthrosis radiotherapy. Gonadal levels in both sexes after radiation of the spinal column ranged widely, and they were obviously a function of the distance between the central focus and the gonad. (21 references)

4970 RAPID CELL DEATH AND CELL POPULATION RECOVERY IN MOUSE SKIN EPIDERMIS AFTER FREEZING. (Eng.) Yamada, S. (Aichi Cancer Center Research Inst., Kanokoden, Tashiro-cho, Chikusa-ku, Nagoya 464, Japan); Tsubouchi, S. *Cryobiology* 13(3): 317-327; 1976.

Rapid cell death and cell population recovery in mouse skin epidermis after freezing were investigated in vivo in female C3H mice. Four freezing areas were obtained on plucked skin treated with liquid nitrogen. All cells frozen at -40 C manifested pycnosis immedately after thawing. The pycnotic cells began to disappear after a latent period of 16 hr. All of the frozen cells disappeared within 24 hr, and the frozen skin area manifested ulceration. The repair of ulceration was initiated by the proliferation of epidermal cells located in the nonfrozen periphery of the skin ulcer. At 6, 14, 21, and 32 days after freezing, cell density was high 750-1,000 μm from the ulcer periphery and, in the outer zone of this hyperplastic area, cell density decreased rapidly to normal. The width of the hyperplastic zone, i.e., from the periphery of the ulcer to the region of normal cell density, was 1.5 mm on day 6 and 3 mm on days 14 and 21, respectively. Cytokinetically, the ulcer was reduced by cell proliferation in the periphery of the ulcer, accompanied by shortening of the cell cycle. The generation times were 65-70 hr in the hyperplastic zone on days 6, 14, and 21 after freezing compared to 238 hr in normal skin. In frozen skin, the S phase ranged from 7 to 7.8 hr, the G2 phase was 2.3 to 2.7 hr, and the G1 phase was 55.4 to 60.4 hr. In contrast, the S phase was 6.7 hr, the G2 phase was 4 hr, and the G1 phase was 225.7 hr in normal skin. After reepithelialization of the ulcer, the hyperplastic zone rapidly recovered to normal cell density. The results suggest that the disappearance of the epidermal cells and the subsequent appearance of an ulcer are essential to the initiation of cell proliferation for tissue repair. (13 references)

4971 SARCOMA ASSOCIATED WITH DACRON PROSTHETIC MATERIAL. CASE REPORT AND REVIEW OF THE LITERATURE. (Eng.) O'Connell, T. X. (Dept. Surgery, UCLA Sch. Medicine, Los Angeles, CA 90024); Fee, H. J.; Golding, A. *J Thor Card Surg* 72(1): 94-96; 1976.

A case involving a fibrosarcoma adjacent to a Dacron aortic bifurcation graft in a 59-yr-old man is presented. A graft was placed between the aorta and both femoral arteries by a 19-mm woven Dacron prosthesis. Thereafter, the patient suffered left leg pains that were related to thrombi containing neoplastic cells indicative of sarcoma. The source of the tumor emboli was unknown; a complete diagnostic evaluation was normal. Thrombectomies of the tumor emboli were performed, and the patient was treated with anticoagulant and chemotherapeutic drugs. Radiation therapy was given to the area above the bifurcation of the Dacron graft, which showed a filling defect; the graft was found to contain a large amount of tumor thrombus, which was removed. Four mo later, after removal of the aortic graft, the patient developed acute renal failure and died. The autopsy revealed intravascular malignant cells in the lower aorta. Animal studies have demonstrated that polymeric materials such as Dacron can produce sarcomas and that pore size between the polymeric strands is of primary importance in the carcinogenicity of the substance. It is suggested that polymeric substances with a pore size less than 0.4 μ should be avoided in surgical procedures on patients. (10 references)

4972 RETICULOENDOTHELIAL NEOPLASMS IN C57 BLACK MICE AFTER FAST-NEUTRON IRRADIATION AT LOW DOSAGE. (Eng.) Mewissen, D. J. (Dept. Radiology, Franklin McLean Memorial Res. Inst., Univ. Chicago, Chicago, IL); Rust, J. H. *ERDA Symp Ser* (37): 230-238; 1976.

4973 COMPARATIVE TUMOR INCIDENCE IN C57BL MICE AFTER FAST-NEUTRON VERSUS COBALT GAMMA-IRRADIATION AT LOW DOSAGE (Meeting Abstract). (Eng.) Mewissen, D. J. (Dept. Radiology, Univ. Chicago, IL 60637); Rust, J. H. *Int J Radiat Biol* 29(6): 580; 1976.

4974 EFFECTS OF URANIUM ORE DUST, RADON AND PRODUCTS OF ITS DECAY IN THE LUNGS OF RATS (Meeting Abstract). (Eng.) Visnjic, V. (Inst. Occupational and Radiological Health, Belgrade, Yugoslavia); Panov, D.; Novak, L. *Health Phys* 31(3): 277; 1976.

4975 STUDIES ON THE LEUKEMOGENIC AND IMMUNOLOGIC EFFECTS OF RADIOSTRONTIUM (^{90}Sr) AND X RAYS IN MICE. (Eng.) Ito, T. (Dept. Pathology, Res. Inst. Nuclear Medicine and Biology, Hiroshima Univ., Kasumicho, Hiroshima, Japan); Nagao, K.; Kawamura, Y.; Yokoro, K. *ERDA Symp Ser* (37): 209-217; 1976.

4976 RADIATION AS A CAUSE OF BREAST CANCER. (Eng.) Simon, N. (Mount Sinai Sch. Medicine, City Univ. New York, New York, NY); Silverstone, S. M. *Bull NY Acad Med* 52(7): 741-751; 1976.

4977 COMPARATIVE EXAMINATION OF CHROMOSOME ABERRATIONS PRODUCED BY GAMMA IRRADIATION OF MAN AND SWINE (Meeting Abstract). (Eng.) Gacevic, M. J. (Inst. Application Nuclear Energy in Agriculture, Veterinary Medicine, Forestry, 11080 Zemun, Baranjska 15, P. O. Box 46, Yugoslavia). *Health Phys* 31(3): 277; 1976.

4978 EFFECT OF ^{144}Ce INHALED IN FUSED-CLAY PARTICLES ON THE TRACHEOBRONCHIAL LYMPH NODES. (Eng.) Hahn, F. F. (Inhalation Toxicology Res. Inst., Lovelace Foundation Medical Education and Res., Albuquerque, NM); Boecker, B. B.; Hobbs, C. H.; Jones, R. K.; Muggenburg, B. A. *ERDA Symp Ser* (31): 218-224; 1976.

4979 MODIFICATIONS OF THYMIC BLAST CELLS DURING MURINE RADIOLEUKAEMOGENESIS (Meeting Abstract). (Eng.) Boniver, J. (Inst. Pathology, Univ. Liege, Belgium); Beaumariage, M. L.; Courtoy, R.; Simar, L. *Int J Radiat Biol* 29(6): 580; 1976.

4980 IN VITRO INTERACTIONS OF LYMPHOCYTES AND CULTURED CELLS FROM BEAGLES WITH PLUTONIUM INDUCED BONE TUMORS. (Eng.) Frazier, M. E. (Biology Dept., Batelle, Pacific Northwest Labs., Richland, WA); Lund, J. E.; Busch, R. H. *ERDA Symp Ser* (37): 197-202; 1976.

4981 HISTORICAL COHORT STUDY OF CANCER RISK FOLLOWING MULTIPLE FLUOROSCOPY (Meeting Abstract). (Eng.) Battigelli, M. C. (Univ. North Carolina, Chapel Hill, NC 27514); McMichael, A. J.; Kuczmarski, R.; Hollingsworth, J. *Am J Epidemiol* 104(3): 315-316; 1976.

4982 THYROID HORMONE MEASUREMENT IN EXPERIMENTA PRODUCTION OF THYROID TUMOURS IN RATS (Meeting Abstract). (Eng.) Al-Hindawi, A. Y. (Univ. Baghdad, Baghdad, Iraq); Black, E. G.; Griffiths, R. S.; Hoffenberg, R. *Acta Endocrinol [Suppl] (Kbh)* 82(204): 59; 1976.

4983 RADIATION EXPOSURE AND HYPERPARATHYROIDIS (Meeting Abstract). (Eng.) Prinz, R. (Dep Surgery, Loyola Univ., Hines, IL); Paloyan, E.; Lawrence, A. M.; Brooks, M. H.; Braithwaite, S.; Pickleman, J. R. *Clin Res* 24(4): 530A; 1976.

4984 RADIATION LOAD OF KIDNEY TRANSPLANT RECIP ENTS CAUSED BY RADIODIAGNOSTICS. (Eng.) Edgren, J. (Fourth Dept. Medicine, Helsinki Univ., Central Hosp., Helsinki, Finland). *Scand J Urol Nephrol [Suppl]* 29: 83-84; 1976.

4985 SCREENING RANDOM ASYMPTOMATIC WOMEN UNDER AGE 50 BY ANNUAL MAMMOGRAPHIES: DOES IT MAKE SENSE? (Meeting Abstract). (Eng.) Bross, I. D.

(Roswell Park Memorial Inst., Buffalo, NY 14263); Blumenson, L. E. *Am J Epidemiol* 104(3): 316; 1976.

4986 X-RAY EXPOSURE AND BREAST CANCER (Meeting Abstract). (Eng.) Boice, J. D. (Harvard Sch. Public Health, Boston, MA 02115); Monson, R. R. *Am J Epidemiol* 104(3): 349-350; 1976.

See also:

* (Rev): 4815, 4816, 4817, 4818, 4819, 4821, 4861, 4862, 4863, 4864, 4866, 4876, 4877
* (Chem): 4921, 4932, 4937, 4954
* (Viral): 5017, 5089
* (Immun): 5110
* (Path): 5159, 5175, 5218, 5220, 5221
* (Epid-Biom): 5326, 5327, 5328, 5329

4987 BIOCHEMISTRY AND ENZYME INDUCTION IN MC-29 VIRUS-INDUCED TRANSPLANTABLE AVIAN HEPATOMA. (Eng.) Kovalszky, I. (Semmelweis Medical Univ., 1085 Budapest, VIII, Ulloi ut 26, Hungary); Jeney, A.; Asbot, R.; Lapis, K. *Cancer Res* 36(7): 2140-2145; 1976.

The macromolecular content and the inducibility of glucose-6-phosphatase (G-6-P), glucose-6-phosphate dehydrogenase (G-6-P-DH), and aryl hydrocarbon hydroxylase (AHH) were compared in chicken liver and in a new transplantable hepatoma derived from the MC-29 virus-induced liver tumor. The alteration of the nucleocytoplasmic ratio was deduced from measurements of the DNA, RNA, protein, and phospholipid contents of the whole cell homogenate and cell fractions. The increased nuclear and decreased cytoplasmic content of macromolecules suggests a dominancy of the nuclei in the tumor cells. G-6-P and AAH activities were lower by 60% and 80%, respectively, in the highly proliferating hepatoma than in the liver. In contrast, G-6-P-DH activity increased in the hepatoma. Enzyme inducers, such as methylcholanthrene, hydrocortisone, and insulin, were able to enhance the activity of these enzymes in the liver but had no stimulating effect on the hepatoma. The studies imply that genetic information could still exist and operate to a minor extent after malignant transformation; various differentiated functions may be present (increased or decreased) in different types of neoplasms; and deficiency in cell regulation is a substantial element of cancer. (37 references)

4988 MAREK'S DISEASE IN CHICKENS: DEVELOPMENT OF VIRAL ANTIGEN IN FEATHER FOLLICLES AND OF CIRCULATING ANTIBODIES. (Eng.) Steck, F. (Inst. Microbiology, Sch. Veterinary Medicine, Univ. Berne, Berne, Switzerland); Haberstich, H. U. *Infect Immun* 13(4): 1037-1045; 1976.

The appearance and persistence of feather follicle (FF) antigen after infection, as detected by the gel precipitation test, were investigated in unvaccinated white Leghorn hybrid chickens and in chickens vaccinated with the herpesvirus of turkeys (HVT). The presence of antigen was compared with the formation of precipitating and neutralizing antibodies and with the development of clinical disease. A virulent strain of Marek's disease herpesvirus (MDHV) was isolated by direct kidney culture from a white Leghorn chicken with the classical form of MD. Infected culture cells were injected in 110 chickens intraabdominally (ia). The number of cells injected per bird corresponded to 10 to 100 plaques in the original cell culture. For immunization, chickens were inoculated ia with about 2,000 plaque-forming units of HVT. About 2 wk after infection with virulent MDHV, 80%-90% of all unvaccinated chickens showed a generalized infection of feather follicles, which later regressed in about one-third. Prior immunization with HVT suppressed this localization of infection to a large extent. In most chickens succumbing to MD the infection persisted in the feather follicles up to the time of death, and only a small fraction of these birds had precipitating antibodies against MDHV-TC and neutralizing antibodies. The results suggest an early spread of the virus by the blood circulation due to the distribution of infected feather follicles more or less symmetrically over the whole body. (24 references)

4989 STUDIES ON MAREK'S DISEASE LYMPHOMA-DERIVE CELL LINES. (Eng.) Powell, P. C. (Houghton Poultry Res. Station, Houghton, Huntingdon, Cambridgeshire PE17 2DA, England). *Bibl Haematol* (43): 348-350; 1976.

Studies concerning the growth of malignant cell line derived from Marek's disease lymphomas (MDCL) and of possible mechanisms involved in the resistance to MD are reviewed. These cell lines can grow in an uncontrolled manner in suitable hosts, but they have not yet been transplanted into chickens. To demonstrate the ability of the cells to grow in vivo, nine adult congenitally athymic (nude) mice were inoculated sc with 2.5 x 10^8 cells of the cell line MSB-1. None of the mice developed tumors at the inoculation site, but one did develop lymphoblastic tumors with infiltration of the liver and lymph nodes. The lymphoblasts were of avian origin. Evidence is cited suggesting that resistance to MD may involve two steps one directed against MD herpesvirus (MDV) replication and spread and one against MD lymphoma development. In tests with chickens, specific cytotoxic activity of blood lymphocytes against cells of the HPRS line 1 was found in birds infected with MDV as well as in birds sensitized by injections of MDCL cells. However, it was unclear whether the antitumo immune reaction in MDV-infected birds played an important part in resistance. To test whether MD lymphomas consist of a mixture of malignant and reactive cells, lymphomas from infected birds were dispersed by trypsinization and used as effector cells in the in vitro cytotoxicity test against MDC cells. Lymphoma cells were cytotoxic to the MDCL cells. It is suggested that reactive lymphocytes might contribute either to rejection of malignantly transformed cells or to the histopathogenesis of th tumors. Specific cytotoxic activity against three MDCL's (HPRS lines 1 and 2 and MSB-1) was also observed in birds experimentally immunized by two injections of 2 x 10^8 HPRS line 1 cells. (10 references)

4990 PARTIAL PURIFICATION AND CHARACTERIZATIO OF OVERGROWTH STIMULATING FACTOR. (Eng.) Burr, J. G. (Dept. Physiology, Harvard Medical Sch Boston, MA 02115); Rubin, H. *Cold Spring Harbor Co Cell Proliferation* 2: 807-825; 1975.

The partial purification and characterization of overgrowth stimulating factor (OSF) are described, and the cellular overgrowth stimulating activity released by the sonication of normal cells (primar chick embryo fibroblasts) is compared with that obtained from cells transformed by the Bryan strai of Rous sarcoma virus (RSV). OSF was purified by Sephadex chromatography of the Rous conditioned medium (RCM) and the normal conditioned medium (NC and the elution behavior of the activity on ion exchange resins was examined. Determinations were also made of the sensitivity of the activity to trypsin and RNase A and of its behavior during SDS-acrylamide gel electrophoresis. A single major peak of stimulatory activity was obtained upon Sephadex chromatography of RCM. The activity had an estimated molecular wt of 20,000 daltons, was 90% eliminated after incubation with trypsin, and was unaffected by incubation with RNase A. The stimulating activity of RCM showed no proteolytic activity and was resolved by ion exchange chromatography into two extremely labile peaks. Coelectrophoresis of the RCM and NCM activities revealed a band of activity present in the RCM that was not present in the NCM. High molecular OSF was present in both RCM and NCM and was sensitive to pronase and ribonuclease, but not to trypsin, DNase, or hyaluronidase. The 20,000-dalton OSF was not present in the NCM. The data provide some support for the hypothesis that OSF is directly involved in the mechanism by which RSV transforms fibroblasts. (27 references)

4991 MACROMOLECULAR DETERMINANTS OF PLASMINOGEN ACTIVATOR SYNTHESIS. (Eng.) Rifkin, D. B. (Dept. Chemical Biology, Rockefeller Univ., New York, NY 10021); Beal, L. P.; Reich, E. *Cold Spring Harbor Conf Cell Proliferation* 2: 841-847; 1975.

Secondary cultures of chick embryo fibroblasts (CEF) infected with a temperature-sensitive mutant of Rous sarcoma virus (ts 68) were used to define some of the factors involved in controlling plasminogen activator synthesis. When CEF-ts 68 cells were shifted from the nonpermissive (41 C) to the permissive (36 C) temperature, the plasminogen activator ncreased noticeably after 2-3 hr, continued to ncrease for 5 hr, and remained constant thereafter. hen the cells were shifted from the permissive to he nonpermissive temperature, the loss of activity as rapid, with a half-time of 1-2 hr. The activator tself was not temperature-sensitive. Enzyme loss uring the latter shift was accelerated by cyclo-eximide, but the cells treated with actinomycin etained a larger proportion of intracellular activa-or for long periods. The effects of 5-bromotuber-idin were similar to those of actinomycin. These ata indicate that maintenance of the cellular enzyme epends on continuing protein synthesis and that nzyme disappearance following the temperature shift equires RNA synthesis. (11 references)

992 THE TRANSFER OF GENETIC INFORMATION OF ONCORNAVIRUSES BY THE DNA FROM TUMOR CELLS. Rus.) Kniazev, P. G. (N. N. Petrov Res. Inst. On-ology, USSR Ministry Health, Leningrad, USSR); znetsov, O. K.; Perevozchikov, A. P.; Korobitsyn, P.; Zhudina, A. I.; Savost'ianov, G. A.; Diad'kova, M.; Seits, I. F. *Vopr Onkol* 22(1): 47-53; 1976.

ree models of genetic transfer are analyzed. ansfection of avian sarcoma virus was induced with ick DNA from the Carr-Silver strain of Rous sar-ma. Immune serum and the parent Rous strain neu-alized homologous virus but were inactive against ansfected virus. Immune serum and transfected rus neutralized homologous virus but not the parent strain. Avian myeloblastosis virus (strain A) was transfected with DNA from chick myeloblasts and elicited a massive and generalized myeloblastosis, with marked splenomegaly, in chicks 18-22 days after intratibial inoculation. Transfection of Prague strain oncornavirus with DNA from rat XC cells was successful in chick embryo cultures; inoculation in chickens led to tumor formation at the portal of entry. The virus transfected with DNA from Rous sarcoma passaged easily in chick embryo cell cultures. It induced tumors in fowl, possessed reverse transcriptase, and structurally resembled C type particles, despite its antigenic difference from the parent strain. Probably the genetic information is transferred incompletely, rather than altered through DNA provirus.

4993 DETECTION OF RNA-INSTRUCTED DNA POLYMERASE IN THE MITOCHONDRIA OF ROUS SARCOMA CELLS USING SEPHADEX G-150 THIN-LAYER GEL FILTRATION. (Eng.) Kara, J. (Lab. for Biochemistry of Viral Carcinogenesis, Czechoslovak Academy Sciences, Praha 6, Czechoslovakia); Dvorak, M. *Folia Biol (Praha)* 22(2): 90-96; 1976.

The DNA polymerase present in the inner mitochondrial membrane and matrix fraction of the mitochondria isolated from Rous sarcoma cells and chick embryo cells and in the lysate of Rous sarcoma virus was analyzed using a thin-layer gel filtration technique. With this method, performed on Sephadex G-150 superfine gel, the molecular wt of the isolated enzymes could be determined simultaneously. An RNA-directed DNA polymerase, activated by the poly(rA): oligo(dT) synthetic duplex, was detected in the mitochondria of Rous sarcoma cells; it had the same molecular weight as the reverse transcriptase isolated from Rous sarcoma virus. This enzyme was not found in the mitochondria of chick embryo cells. The results suggest that mitochondria in tumors induced by RNA tumor viruses in vivo participate in the biosynthesis of these oncogenic viruses and in the expression of viral genes; in addition, they indicate that virus-specific syntheses may also occur. (27 references)

4994 ON THE SYNTHESIS OF THE RNA OF ROUS SARCOMA VIRUS. (Eng.) Brdar, B.; Rifkin, D. B.; Reich, E. *In: Host Environment Interactions in the Etiology of Cancer in Man. Proceedings of a Meeting Held at Primosten, Yugoslavia, 27 August-2 September 1972.* International Agency for Res. on Cancer (Lyon, France); pp. 419-425; 1973.

The effect of 5-fluorouridine (FUR) on the synthesis of Rous sarcoma virus (RSV) in transformed chick embryo fibroblasts was investigated. Primary monolayer cultures were infected with a high-titer derivative of the nondefective Schmidt-Ruppin D' strain of RSV. Proteins from the released virus were analyzed by sodium dodecyl sulfate-polyacrylamide gel electrophoresis. The growth of both transformed and normal cells was immediately and irreversibly stopped by FUR concentrations as low as 0.1 μg/ml; after a

32-hr exposure, DNA synthesis was decreased by 95%, RNA synthesis by 91%, and protein synthesis by 57%, compared with untreated controls. The relatively high rate of protein synthesis implies that mRNA is made at a correspondingly high rate and must account for much of the residual RNA in FUR-treated cultures. Monitoring the incorporation of tritiated leucine or adenosine into the virus showed that there was no significant difference in virus synthesis in the treated and control cultures during the 3-day observation period; the two cultures produced identical amounts of virus RNA and protein. Although there was no demonstrable difference in the size of the viral RNA made in the presence of FUR, the specific infectivity (in terms of the focus-forming titer) was lowered by a factor of 10-20. It was concluded that FUR inhibits the synthesis of ribosomal RNA, but not that of messenger or heterogenous RNA or that of RSV-RNA protein; that RSV-RNA shares the characteristics of heterogeneous and messenger RNA; and that the expression of different cellular genome segments may be subject to specific, identifiable controls that may be exploitable for therapy. (15 references)

4995 SARCOMAS IN SYRIAN HAMSTERS, INDUCED BY A CELL-FREE TRANSMISSIBLE ONCORNAVIRUS. (Ger.) Graffi, A. (Zentralinstitut fuer Krebsforschung, DDR-1115 Berlin-Buch, Lindenberger Weg 70, East Germany); Bender, E.; Schramm, T.; Graffi, I.; Niezabitowski, A.; Schneiders, F. *Arch Geschwulstforsch* 46(2): 77-84; 1976.

Further studies of the hamster papovavirus induction of sarcomas and the carcinogenicity of their cell-free extracts are reported. Either 1- to 3-day-old or 3- to 6-wk-old HaP strain Syrian hamsters were used. Hamster papilloma virus administered to the newborns elicited sarcomas in 13 animals surviving longer than 6 mo; 50% of the newborns succumbed to lymphomas or leukemias in 3 mo or less. Cell-free extracts from this primary sarcoma elicited 13 sarcomas in 46 hamsters surviving more than 6 mo; cell-free extracts from a transplanted sarcoma induced 20 sarcomas in 111 hamsters. The effective carcinogenicity of cell-free filtrates decreased with increasing in vivo passage. Of 175 newborns treated with the sarcoma extract, 13 developed leukoses, especially lymphomas, in addition to sarcomas. Cell-free extracts from both primary and transplanted hamster sarcomas were completely negative in 86 mice and 78 rats. Type C oncornavirus, but not infecting papovavirus, was detected in the papovavirus-induced sarcomas. (10 references)

4996 REVERSE TRANSCRIPTASE IS CODED FOR BY THE VIRAL RNA. (Eng.) Verma, I. M. (Salk Inst., Post Office Box 1809, San Diego, CA 92112); Hunter, E. *Bibl Haematol* (43): 457-459; 1976.

The thermolability of DNA polymerase activities from several temperature-sensitive (ts) mutants of avian and murine RNA tumor viruses was studied to determine whether reverse transcriptase is coded for by the viral RNA. The viruses studied were Rous sarcoma virus Prague strain (PR-C), avian sarcoma virus strain Bratislava 77 (B77-C), ts LA335 PR-C, ts LA337 PR-C, ts LA336 B77-C, Rauscher murine leukemia virus (R-MuLV), and a mutant of R-MuLV, ts 29. Both the DNA polymerase and RNase H activities of all three mutants of avian sarcoma viruses were 5 to 20 times more rapidly heat inactivated than the corresponding wild-type enzymatic activities. Approximately 5 to 10 times less viral DNA was synthesized by three mutants at nonpermissive temperatures than was synthesized by the wild-type virus. The DNA-dependent DNA polymerase and RNase H activities of purified reverse transcriptase from ts 29 were more thermolabile than the corresponding wild-type enzymatic activities. The covariation of the thermolability of DNA polymerase and RNase H activities of ts 29 suggested that, like the avian RNA tumor viruses, the two activities were an integral part of the reverse transcriptase activity from murine leukemia viruses. The inability of the mutant viruses to establish infection and transformation at nonpermissive temperatures was due to a lesion in their virion reverse transcriptase. The data indicate that reverse transcriptase is coded for by the viral RNA and is essential to establish infection by RNA tumor viruses. (11 references)

4997 MITOGEN INDUCTION OF MURINE C-TYPE VIRUSES I. ANALYSIS OF LYMPHOID CELL SUBPOPULATIONS. (Eng.) Schumann, G. (Pharmaceuticals Div., Ciba-Geigy Ltd., CH 4058 Basel, Switzerland); Moroni C. *J Immunol* 116(4): 1145-1150; 1976.

To identify the cell types sensitive to virus induction and to study the relationship of mitogenicity to virus induction, T cell populations (BALB/c thymu cells and cortisone-resistant thymus cells), B cell populations (nu/nu spleen cells and lymph node cell adherent BALB/c peritoneal cells, and mixed populations (BALB/c spleen cells, macrophage-depleted BALB/c spleen cells, and lymph node cells) were compared. Lipopolysaccharide (LPS) induction occurr only in B cell-containing populations. Induction by concanavalin A/5-bromo-2'-deoxyuridine (Con A/BrdU) depended on the presence of both T and B cells; neither macrophages nor hemopoietic cells appeared to be a major source of virus for either of these two. Treatment with anti-Ig serum and complement reduced virus induction by LPS/BrdU but not by Con A/BrdU. Different cell populations apparently produce virus after stimulation with these two differe mitogens.

4998 HEMOGLOBIN PRODUCTION IN CULTURED FRIEND LEUKEMIA CELLS INDUCED BY A HUMAN PLACENTAL EXTRACT PREPARATION. (Eng.) Ikawa, Y. (Lab. Viral Oncology, Cancer Inst., Kami-Ikebukuro, Toshi ku, Tokyo 170 Japan); Aida, M.; Saito, M. *Gann* 66(583-584; 1975.

In a search for differentiation inducers other tha dimethyl sulfoxide, the effectiveness of a heat-treated human placental extract (PLP) was tested. Addition of 2%-3% PLP to the clonal culture lines Friend leukemia cells (T-3-Cl-1 and -2) resulted i the appearance of hemoglobin (Hb)-positive cells after 4-6 days. The 3% PLP concentration gave a slightly delayed elevation of Hb production compared with dimethyl sulfoxide treatment according to biochemical quantitation methods, but cytologic staining of Hb-positive cells showed similar patterns. The PLP concentration that resulted in a slight suppression of cell growth gave better results than high concentrations, which are toxic to the cells. The T-3-Cl-2 clone appears less sensitive than T-3-Cl-1 to PLP. The effective component in PLP may be either acetic acid (revealed by gas-liquid chromatography) or a certain polypeptide of about 5,000-15,000 molecular wt (revealed by Sephadex fractionation). The sensitivity and specificity of PLP differ from those of acetic acid when tested on some Friend leukemia cell variants. The possibility that the major effective fraction of PLP is other than acetic acid is suggested. (8 references)

4999 IMMUNOFLUORESCENCE AND HISTOLOGIC STUDIES OF VIRUS-INDUCED MURINE LYMPHOCYTIC LEUKEMIAS. (Eng.) Dawson, P. J. (Dept. Pathology, Univ. Oregon Health Sciences Center, Portland, OR 97201); Dresler, S. L.; Fieldsteel, A. H. *J Natl Cancer Inst* 56(5): 1047-1050; 1976.

Lymphocytic leukemias induced by four viruses were examined to determine which functional class of lymphocyte undergoes leukemic transformation and if this could be correlated with the morphologic expression of the disease. Newborn and young adult BALB/c mice were inoculated with either the lymphatic leukemia virus associated with Friend and Rauscher viruses or with the Graffi or BALB/Tennant leukemia viruses. A total of 48 leukemic mice were examined histologically and by immunofluorescence. All four viruses induced a histologically similar disease that involved the thymus-dependent lymphoid regions in particular. Lymphocytes from the spleens and thymuses of leukemic animals were examined for Thy-1 antigen and immunoglobulins on the cell surface; all the leukemias were composed of T-cells and/or nonreactive cells lacking both the Thy-1 antigen and immunoglobulins. By immunofluorescence, the spleen and thymus from the same leukemic animal frequently showed different cell-surface markers, though no morphologic differences were seen in leukemias involving the different classes of lymphocytes. This suggests that these viruses all may produce malignant change by the same pathway. (21 references)

5000 CELL LINES ESTABLISHED FROM (BALB/C X DBA/2)F_1 MICE WHICH SHOW PARENT TYPE SUSCEPTIBILITY TO MURINE LEUKEMIA VIRUSES. (Eng.) Hoshino, H. (Dept. Oncology, Inst. Medical Science, Univ. Tokyo, Shirokanedai, Minato-ku, Tokyo 108, Japan); Yamamoto, T. *Japan J Exp Med* 46(1): 71-77; 1976.

The susceptibility of two tissue culture cell lines established from (BALB/c X DBA/2)F_1 (CDF_1) mice to murine leukemia viruses (MLV) was compared with those of various cell lines. Although the embryo cells of CDF_1 mice were resistant to both N and B tropic MLV, one cell line was susceptible to N tropic MLV and the other to B tropic MLV, indicating that these cell lines do not have the same susceptibility to MLV as the embryo cells. Cell lines established from N and B type inbred mice kept their original susceptibility to MLV. These results suggest that the phenotype of some F_1 hybrid mouse cells tends to change into either parental type after establishment as cell lines. A possible explanation for the change of susceptibility to MLV is that one of the Fv-1 genes might be lost in some cells during the course of establishing the cell lines, as the karyotypes of the cells change. (24 references)

5001 EFFECTS OF METABOLIC INHIBITORS ON ONCORNAVIRUS PRODUCTION DURING SYNCHRONIZED CELL GROWTH. (Eng.) Panem, S. (Dept. Pathology, Div. Biological Sciences, Univ. Chicago, Chicago, IL 60637); Kirsten, W. H. *Bibl Haematol* (43): 472-474; 1976.

To determine the events imposing cell-cycle dependency on virus replication, the effects of inhibitors of contractile protein activity and RNA synthesis were studied on the release of Kirsten murine sarcoma-leukemia virus KiMSV(KiMuLV) from chronically infected normal rat kidney cells. Cytochalasin B (CB) and vinblastine sulfate (VB) inhibited the release of KiMSV(KiMuLV), measured by the amount of RNA-dependent DNA polymerase in spent culture fluids. Concentrations of VB that inhibited virus release also inhibited mitosis and cell division, but 10-25 μg/ml of CB inhibited virus release without affecting cell division. Tests with synchronized cultures showed that inhibition of virus release by CB was cell-cycle dependent and occurred in the late G2 phase prior to the condensation of viral budding forms at the plasma membrane. The results of treatment of cells with actinomycin D also indicated that viral RNA synthesis occurred during late S-early G2. (14 references)

5002 EXPERIMENTAL ONCORNAVIRUS VACCINES IN THE CAT. (Eng.) Olsen, R. G. (Dept. Veterinary Pathobiology, Ohio State Univ., Columbus, OH 43210); Schaller, J. P.; Hoover, E. A.; Yohn, D. S. *Bibl Haematol* (43): 515-517; 1976.

An attempt was made to define the vaccine and host factors that lead to the optimum production of viral-neutralizing (VN) antibody, antibody to tumor antigen, and protection from oncogenesis. Tests were conducted to determine the VN antibody response of 43 kittens and 7 pregnant adult cats immunized with inactivated Gardner Arnstein feline sarcoma virus (GA-FeSV). During the first 7 wk, no responses were seen in the kittens, but all adults responded with a mean VN antibody titer of approx 1:14. After challenge with infectious FeSV, no significant VN titers were seen in the immunized kittens. Twenty-eight kittens were immunized with UV- or formalin-inactivated GA-FeSV and challenged with live virus at 5-6 wk of age. No significant differences in latent period of tumor development, tumor growth patterns, or in mean survival time were observed between immunized and nonimmunized groups. To test for the passive transfer of immunity, 12 kittens from GA-FeSV-vaccinated cats and 12 kittens from nonvaccinated cats were challenged with GA-FeSV. All of the latter kittens developed tumors and 11 died within 21 wk of age, but only 9 of the former developed tumors. Three failed to develop any tumor during 36 wk of observation. When Rickard feline leukemia virus was used as the challenge virus, all nonimmunized kittens died within 19 wk after the challenge; 75% of immunized kittens died of FeLV-related disease within 32 wk, but 25% did not develop disease after more than 70 wk. Six wk-old kittens immunized with Synder-Theilen feline sarcoma virus (ST-FeSV) tumor homogenates and kittens immunized with FL-74 cells produced a specific antibody response to feline oncornavirus-associated cell membrane antigens that correlated with resistance to challenge with virulent ST-FeSV. (2 references)

5003 REPLICATION OF BOVINE LEUKEMIA VIRUS IN MONOLAYER CELL CULTURES. (Eng.) Van Der Maaten, M. J. (Natl. Animal Disease Center, North Central Region, Agricultural Res. Service, US Dept. Agriculture, PO Box 70, Ames, IA 50010); Miller, J. M. *Bibl Haematol* (43): 360-362; 1976.

Studies were untaken to identify permissive cell types for the replication of bovine leukemia virus (BLV) in monolayer cell cultures and to maximize virus production from cell lines. In preliminary studies with fetal lamb spleen cell cultures, virus replication increased during the first several passages and then stabilized. Inocula containing high concentrations of virus were required to establish cultures with optimal virus replication. Fluids from cultures treated with DEAE dextran prior to exposure to BLV had complement fixation titers of 1-8, while fluids from untreated cultures had titers of 1-2. Fetal lamb kidney cultures developed titers comparable to those obtained with fetal lamb spleen cells; fetal lamb lung and testicle cultures also supported BLV replication. Bovine cells were generally resistant to infection, with the exception of fetal bovine thymus cultures. The virus also replicated in bat lung cells but not in monkey or chimpanzee cells. Supernatant fluids from the fetal lamb spleen cell cultures were useful sources of material for preliminary biochemical studies of BLV, but high levels of virus replication were not obtained. Therefore, the search for a more permissive culture system is being continued. (5 references)

5004 BIOCHEMICAL CHARACTERIZATION OF BOVINE LEUKEMIA VIRUS. (Eng.) Portetelle, D. (Dept. Molecular Biology, Lab. Biological Chemistry, Univ. Brussels, 67 rue des Chevaux, B-1640 Rhode-St-Genese, Belgium); Kettmann, R.; Mammerick, M.; Cleuter, Y.; Galoux, M.; Leclercq, M.; Dekegel, D.; Ghysdael, J.; Burny, A.; Chatrenne, H. *Bibl Haematol* (43): 363-365; 1976.

The biochemical characteristics of bovine leukemia virus (BLV) are summarized. BLV reverse transcriptase is very sensitive to nonionic detergent concentrations and does not accept Mn^{++} as the divalent cation Tritiated BLV complementary DNA (^3H cDNA) sedimenting in the 60S-70S region following sucrose gradient centrifugation was alkali treated and used in molecular hybridization reactions. No clear relationship was detected between BLV and Mason-Pfizer monkey virus, avian myeloblastosis virus, simian sarcoma virus, or feline leukemia virus. There was a slight relationship between BLV and Rauscher leukemia virus. Hybridization kinetics between BLV ^3H cDNA and normal or leukemic bovine DNA suggested that bovine leukemic DNA contains viral sequences that are not present in normal DNA. Animals infected with BLV synthesized antibodies against the main low molecular wt viral protein, P 24. It is concluded that BLV is a bovine RNA oncogenic virus with practically no relatedness to known leukemia virus. (16 references)

5005 INDUCTION OF LYMPHOID TUMORS IN SHEEP WITH CELL-FREE PREPARATIONS OF BOVINE LEUKEMIA VIRUS. (Eng.) Van Der Maaten, M. J. (Natl. Animal Disease Center, North Central Region, Agricultural Res. Service, US Dept. Agriculture, PO Box 70, Ames, IA 50010); Miller, J. M. *Bibl Haematol* (43): 377-379; 1976.

The development of lymphoid neoplasms in sheep inoculated with cell-free preparations of bovine leukemia virus (BLV) was investigated. In one experi ment, nine 3-mo-old lambs were inoculated ip with 7 ml of supernatant fluids from short-term cultures established from lymphocytes of a 4-yr-old steer persistently infected with BLV. Lymphocytes were filtered through a 450-nm membrane before inoculation. Twenty crossbred ewes and their newborn lambs were inoculated 24 hr after parturition in a second experiment as follows: (a) 5 ewes and their 8 lambs were inoculated iv with infectious unfiltered culture fluids; (b) 9 ewes and their 13 lambs were inoculated iv with fluids filtered through a 450-nm membrane; and (c) 2 ewes and their 3 lambs were inoculated with control materials. All the sheep in the first experiment developed persistent BLV infec tions. Antibodies were detected 2-5 mo after inocul tion and persisted for 30 mo. Three sheep develope lymphoid tumors and died 15-19 mo after inoculatio In the second experiment, all the ewes and lambs inoculated with BLV were infected. Serological responses were generally detected earlier in lambs than in ewes. Only one animal subsequently develop tumors. An elevated leukocyte count was detected i this lamb 23 mo after inoculation and it died 2 mo later. Because of a total absence of vertical or horizontal transmission of BLV among the sheep flo during a 3-yr observation period, it is unlikely that the BLV inoculation activated a latent or end enous ovine leukemia virus. (10 references)

5006 DIFFERENT PATTERNS OF POLYADENYLATION OF RHINOVIRUS: SPECIFIED RNA DURING MULTIPL TION IN HUMAN ANEUPLOID AND DIPLOID CELLS. (Eng.) Macnaughton, M. R. (Dept. Biological Sciences, Uni Warwick, Coventry CV4 7AL, England); Dimmock, N. *J Gen Virol* 30(2): 263-267; 1976.

The polyadenylation of rhinovirus-specified RNA in aneuploid HeLa cells and diploid human embryo lung (HEL) cells was investigated. Polyadenylation occurred at a faster rate and more extensively to virus-specified RNA in infected HEL cells compared with HeLa cells. Polyadenylic acid [poly(A)] is added post-transcriptively in both cell types. Furthermore the addition of adenosine or poly(A) during virus multiplication increased the polyadenylation of virus single-stranded RNAs in both cell types, but to a greater extent in HeLa cells.

5007 PLASMINOGEN ACTIVATORS OF TRANSFORMED AND NORMAL CELLS. (Eng.) Goldberg, A. R. (Rockefeller Univ., New York, NY 10021); Wolf, B. A.; Lefebvre, P. A. *Cold Spring Harbor Conf Cell Proliferation* 2: 857-868; 1975.

A casein-agar overlay assay and the cleavage of the hemagglutinin (HA) polypeptide to polypeptides HA1 and HA2 were used to determine whether normal and transformed cells produce proteases that might act to alter the cell surface. Little if any difference was observed in the plasminogen activator activity between contact-inhibited cultures of mouse epithelial cells and cells transformed by either simian virus 40 or murine sarcoma virus (MSV). Nitrophenylguanidinobenzoate (NPGB), a potent inhibitor of the plasminogen activator and plasmin, inhibited the growth of several established cell lines; no difference was observed in the inhibition of transformed and untransformed cells. Cell growth was not inhibited by p-nitrophenol. NPGB also affected the morphology of BALB/3T3 mouse cells transformed by MSV, causing them to lose their refractility, appear to have fewer long processes, and often align themselves parallel to one another; the effect was dose dependent. Pentamidine isethionate and alanylphenylalanyllysyl-CH_2Cl inhibited the growth of all cultures tested, whereas the D-stereoisomer of the latter compound was much less effective. It is unknown whether these protease inhibitors exert their inhibitory effect on cell growth by interacting with intracellular, extracellular, or plasma membrane-bound proteases. (18 references)

5008 MAPPING OF MUTATIONAL ALTERATIONS IN DNA WITH S_1 NUCLEASE: THE LOCATION OF DELETIONS, INSERTIONS AND TEMPERATURE-SENSITIVE MUTATIONS IN SV40. (Eng.) Shenk, T. E.; Rhodes, C.; Rigby, P. W. J.; Berg, P. *In: Tumor Viruses. Cold Spring Harbor Symposia on Quantitative Biology.* Cold Spring Harbor Lab. (Cold Spring Harbor, NY): vol. 39, pp. 61-67; 1975.

The use of the S_1 nuclease from *Aspergillus oryzae* was investigated in mapping the location of small deletions or insertions, or differences in base sequences between otherwise homologous DNAs. S_1 nuclease was used to locate a deletion of about 190 base pairs and an insertion of about 50 base pairs. S_1 nuclease can also cleave a heteroduplex formed from the DNAs of a simian virus 40 (SV40) temperature-sensitive (ts) mutant and either its revertant or wild-type parent. The map positions determined for the SV40 ts A30 and ts D202 mutations by this method are consistent with the locations found by other means. S_1 may be useful in detecting and mapping single base changes as well. This method provides a technique of genetic mapping in systems in which genetic recombination is lacking or difficult to measure. Genotypic alterations that cause no detectable change in phenotype can be located. Mutations of a variety of types can be physically mapped if the genome can be isolated in its homogeneous form. Finally, the ability of S_1 nuclease to cleave a duplex DNA at a mismatch may provide a way to isolate discrete segments of a genome if that segment can be bounded by small deletions. (17 references)

5009 IMMUNOLOGICAL RELATIONSHIP BETWEEN AN ONCORNAVIRUS ISOLATE FROM HEP-2 CELLS, MASON-PFIZER MONKEY VIRUS, AND HUMAN TUMOR CELLS. (Eng.) Priori, E. S. (Viral Oncology, Frederick Cancer Res. Center, Post Office Box B, Frederick, MD 21701); Ilyin, K. V.; Dmochowski, L.; Fine, D. L. *Bibl Haematol* (43): 488-490; 1976.

The prevalence of antigens related to Mason-Pfizer monkey virus (M-PMV) and/or HEp-2(R) virus in human cells was investigated. Antisera directed against disrupted HEp-2(R) or M-PMV reacted by fixed immunofluorescence tests with some related antigen(s) in cells of cultures derived primarily from human carcinomas but not with cultures derived from sarcomas, other types of tumors, or normal tissues. Positive reactions occurred with the following: HeLa cell cultures; lung, kidney, epidermoid, and breast carcinoma cell cultures; and three cultures reportedly derived from breast carcinoma but with HeLa cell marker chromosomes. Similar cytoplasmic antigens were seen in cells of some samples of fresh tumor (breast, lung) and/or pleural effusions (breast). Although electron microscopic study of some cultures showed no oncornaviruses, the cytoplasmic antigen may still be an expression of incomplete virus. (12 references)

5010 PROVIRAL SEQUENCES OF BABOON ENDOGENOUS TYPE C RNA VIRUS IN DNA OF HUMAN LEUKAEMIC TISSUES. (Eng.) Wong-Staal, F. (Lab. Tumor Cell Biology, Natl. Cancer Inst., Bethesda, MD 20014); Gillespie, D.; Gallo, R. C. *Nature* 262(5565): 190-195; 1976.

Type C RNA viruses have been linked to human leukemias; however, a DNA provirus related to a major portion of the human cell genome has not been demonstrated. It is suggested that the proviral sequences of the baboon type C RNA virus are present in human leukemic tissues. Two infectious viruses were isolated from cultured human cells, one related to a simian sarcoma-leukemia virus (SiSV) and one related to a baboon endogenous virus (BaEV). Using RNA-DNA hybridization techniques it has been determined that the DNA from some leukemias hybridized 70% of the BaEV RNA, whereas the DNA from normal human tissues hybridized only 23% of the BaEV RNA. No proviral sequences related to SiSV could be detected in the leukemic patient studies. Studies of the thermal stability of the hybrids showed that the values of the hybrids formed with the DNA from leukemic tissues were higher than those of hybrids from normal tissues. The detection of BaEV proviral DNA in the positive patients was reproducible. Possible mechanisms of the horizontal transmission of BaEV among humans are discussed. (36 references)

5011 KINETICS OF TYPE C VIRION RELEASE FROM A HUMAN DIPLOID FIBROBLAST STRAIN. (Eng.) Panem, S. (Dept. Pathology, Univ. Chicago, Chicago, IL 60637); Prochownik, E. V.; Kirsten, W. H. *Bibl Haematol* (43): 572-573; 1976.

Virion antigen expression and virion induction from HEL-12 cells (of diploid human embryonic lung fibroblasts) were examined at various times during in vitro cell propagation. Reverse transcriptase activity in the culture fluids of serially propagated HEL-12 cells was not detected until day 60 of growth. Enzyme levels then increased by day 130. Indirect immunofluorescence was used to determine the appearance of antigens in HEL-12 cells reacting with antiserum against disrupted simian sarcoma virus type 1 (anti-SSV) and the purified 28,000 molecular wt antigen of RD114 virus (anti-RD114p28). Cytoplasmic fluorescence with anti-SSV serum was found from days 16 to 70; fluorescence against this serum persisted during the period of spontaneous virion release and declined with decreasing reverse transcriptase activity. Antigen expression in HEL-12 cells that cross-reacted with anti-RD114p28 serum was detected only during spontaneous virion release. It is suggested that type C virion expression in HEL-12 cell cultures occurs prior to the release of complete particles. To test whether 2-deoxy-D-glucose (2-DG) can induce C viruses from non-virus-producing human cells, HEL-12 cells were treated with fresh medium or medium containing 2-DG during in vitro growth. Spontaneous or induced C virions were not found until day 74 of growth; virion induction was maximal at day 82. As spontaneous virion release increased, the ability of 2-DG to induce C virions disappeared. Thus, the spontaneous antigen expression or release of C virions and the virion induction by 2-DG are sequentially ordered and confined to certain phases of the in vitro growth of a human fibroblastlike cell strain. (10 references)

5012 HOST SUBSTITUTION IN SV40 AND POLYOMA DNA. (Eng.) Winocour, E.; Frenkel, N.; Lavi, S.; Osenholts, M.; Rozenblatt, S. *In: Tumor Viruses. Cold Spring Harbor Symposia on Quantitative Biology.* Cold Spring Harbor Lab. (Cold Spring Harbor, NY): vol. 39, pp.101-108; 1975.

The nature and variety of host DNA sequences in different populations of substituted SV40 and polyoma viruses were studied and the data related to the number and nature of viral recombination sites in the permissive host's genome. The proportion and nature of host sequences in substituted SV40 DNA and the deletion and reiteration of viral sequences in serially passaged SV40 DNA were also investigated. The data are entirely consistent with the proposal that, when multiplicity conditions permit complementation of the deleted functions, substituted viral genomes replicate faster than those of the nondefective standard virus. The reiteration of certain viral sequences in that part of the genome where replication is initiated provides a plausible explanation for the preferential replication rate of substituted virus. (24 references)

5013 ABSENCE OF TERATOGENIC AND CARCINOGENIC EFFECTS OF SV40 VIRUS IN BD-IX RATS ON APPLICATION DURING PREGNANCY. (Ger.) Ivankovic, S. (Deutsches Krebsforschungszentrum, Im Neuenheimer Feld 280, D-6900 Heidelberg, West Germany); Sauer, G. *Z Krebsforsch* 85(2): 177-179; 1976.

The transplacental effect of simian virus 40 (SV40) virus (type Rh 911) on rat fetuses of the BD-IX strain was explored, since there are established parallels between the prenatal induction of neurogenic tumors in rats and human pathology. SV40 suspensions (1 ml, 2.5 x 10^7 plaque-forming units/ml) were given iv to 10 pregnant females 10-13 days postcoitum. No teratogenic outcome was found in 68 offspring at term. Five other pregnant females received the suspension 20 days postconception, and all 29 offspring were normal. No malignancy appeared in any offspring at sacrifice 745-870 days postpartum. Maternal symptoms were also negative up to 800 days postinjection. (10 references)

5014 EXPERIMENTAL INFECTION OF MARMOSET AND SQUIRREL MONKEYS WITH ATTENUATED HVS. (Eng.) Falk, L. (Dept. Microbiology, 1753 West Congress Parkway, Chicago, IL 60612); Schaffer, P.; Wright, J.; Deinhardt, F.; Wolfe, L.; Benyesh-Melni M. *Bibl Haematol* (43): 336-338; 1976.

The infectivity and oncogenicity of an attenuated strain of herpesvirus saimiri (A-HVS) in cotton-topped (CT) and white-lipped (WL) marmosets and in squirrel monkeys were evaluated. The attenuated virus probably arose by spontaneous mutation and/or selection during the passage of oncogenic HVS (O-HVS) at 39 C and subsequent isolation during clonin at 34 C. Animals were inoculated with about 6 x 10^2 to 4 x 10^4 plaque-forming units of A-HVS. Infection was demonstrated in both squirrel monkeys, all CT marmosets, and in one of six WL marmosets. All remained free of overt experimentally induced disease. Antibodies to early antigens (EA) and late antigens (LA) developed in all animals from which virus was recovered. HVS was usually first recovered 2 to 5 after inoculation from lymphocytes or whole blood cocultivated with vero cell cultures. The number of virus-carrying lymphocytes remained fairly constan at 1 of 500,000 cells. Two CT marmosets, latently infected for more than 82 wk, have had relatively constant levels of antibodies to EA and LA, and virus can still be recovered from the circulating lymphocytes. Virus was recovered from one of the animals, passed several times in vitro, and used t inoculate two new CT marmosets; they became latent infected but were free of clinical disease. The sequence of events following infection with either

A-HVS or O-HVS is probably similar, but in the latter case the number of HVS-genome positive and transformed lymphocytes usually increases until death concomitantly with the onset of lymphocytic leukemia; in the former the number of virus-carrying lymphocytes remains constant. (5 references)

5015 LYMPHOCYTE RESPONSIVENESS IN SQUIRREL, CEBUS, AND MARMOSET MONKEYS INFECTED WITH *HERPESVIRUS SAIMIRI*.

(Eng.) Kalter, S. S. (Div. Microbiology Infectious Diseases, Southwest Foundation Res. Education, PO Box 28147 (8848 Commerce St.), San Antonio, TX 78284); Kniker, W. T.; Harvey, J. S., Jr.; Felsburg, P. J.; Heberling, R. L. *Bibl Haematol* (43): 384-387; 1976.

Lymphocyte responsiveness during *Herpesvirus saimiri* (HSV) infection was studied in the natural host, the squirrel monkey (*Saimiri sciureus*); in the cebus monkey (*Cebus albifrons*); and in the marmoset (*Saguinus cedipus*). The five squirrel monkeys remained healthy for 1-2 yr. All four cebus monkeys appeared healthy when blood samples were taken 3 mo after HVS infection, but one died a month later with lymphoproliferative disease. At this time, virus was recovered from the lymphocytes of the three survivors. Virus was again found in the same three animals 23 mo after infection, when they still appeared to be in good health. Five inoculated marmosets died 1 mo after infection. Lymphocyte blastogenesis studies were performed on whole blood. The blastogenic index was calculated by dividing the average cpm of three unstimulated control cultures into the average cpm of the stimulated cultures containing HSV antigen or mitogen. There was no evidence of significant suppression of response to mitogens in any of the squirrel monkeys. In general, the squirrel and cebus monkeys were compared in their ability to respond both to mitogens and to HSV antigens. When tested at the time of terminal illness, all the marmosets showed marked elevations in background counts. Absolute responses to all mitogens and HSV were less than the background, with transformation indices of 0.2-1.0. The data suggest an inhibition of lymphocyte blastogenesis by stimulators added in vitro to lymphocytes already intensely stimulated by virus, and support the thesis that viral tumors are associated with a depression of immunologic responsiveness. (5 references)

5016 ANTILYMPHOCYTIC FACTOR DERIVED FROM A *HERPESVIRUS SAIMIRI* LYMPHOID TUMOR CELL LINE.

(Eng.) Neubauer, R. H. (Litton Bionetics, Inc., 5516 Nicholson Lane, Kensington, MD 20795); Wallen, W. C.; Rabin, H. *Bibl Haematol* (43): 388-391; 1976.

Preliminary studies of the effect of *Herpesvirus saimiri* (HVS) tumor cells (MLC-1 cell line) on normal peripheral blood lymphocytes (PBL) suggested that MLC-1 cells produced or contained a factor(s) capable of inhibiting the mitogenic response of normal PBL. Cell extracts or culture fluids inhibited phytohemagglutinin (PHA)-induced DNA synthesis to dilutions as great as 1:5,120. When tested against human PBL, a variety of nonhuman primate PBL, and murine splenic lymphocytes, MLC-1 preparations were uniformly effective in suppressing PHA responses. A lack of species or tissue specificity was also evidenced by the inhibition of DNA synthesis in monolayer cell cultures of avian, murine, feline and primate origin. Analysis of soluble tumor cell products in the plasma of HVS-infected owl monkeys indicated that interferon-like activity was present in the pleural fluid of an owl monkey with lymphoma, and interferon titers as high as 640 units/ml were present in 3-day culture fluids from PBL or HVS-infected animals and in plasma from a few leukemic monkeys. Plasma collected from five HVS-infected owl monkeys at various points in their disease gave varying degrees of inhibition (0.20-1.0) of the PHA response. Plasma from leukemic animals was effective in inhibiting the PHA response of normal PBL. (7 references)

5017 ULTRAVIOLET ENHANCED REACTIVATION OF A HUMAN VIRUS: EFFECT OF DELAYED INFECTION.

(Eng.) Backstahler, L. E. (Bureau Radiological Health, Food and Drug Administration, Dept. Health, Education and Welfare, Rockville, MD 20852); Lytle, C. D.; Stafford, J. E.; Haynes, K. F. *Mutat Res* 35(2): 189-198; 1976.

The ability of UV-irradiated herpes simplex virus to form plaques was examined in monolayers of CV-1 monkey kidney cells preexposed to UV radiation at different intervals before virus assay. Analysis of UV reactivation (Weigle reactivation) curves showed that as the interval between cell UV irradiation (0-20 J/m^2) and initiation of the virus assay was increased over a period of 5 days, (a) the capacity of the cells to support unirradiated virus plaque formation (which was decreased immediately following UV exposure to the monolayers) increased and returned to approximately normal levels within 5 days and (b) at 5 days an exponential increase was observed in the relative plaque formation of irradiated virus as a function of UV fluence (dose) to the monolayers. For high UV fluence (20 J/m^2) to the cells, the relative plaque formation by the UV-irradiated virus at 5 days was about 10 times higher than that obtained from assay on unirradiated cells. This enhancement is interpreted as a delayed expression of Weigle reactivation. The amount of enhancement resulting from this delayed reactivation was several times greater than that produced by the Weigle reactivation that occurred when irradiated herpes virus was assayed immediately following cell irradiation. (15 references)

5018 INACTIVATION OF HERPES SIMPLEX VIRUS TYPES 1 AND 2 IN VITRO BY HYDROGEN PEROXIDE.

(Ger.) Oberender, H. (Institut fuer Medizinische Mikrobiologie und Epidemiologie des Bereiches Medizin, Wilhelm-Pieck-Universitaet, 25 Rostock, Leninallee 70, East Germany); Kunkel, M.; Gaertner, L.; Koehler, B. *Dtsch Gesundheitswes* 31(26): 1235-1237; 1976.

Herpes simplex virus suspensions of 100 TCID$_{50}$/01. ml were incubated at 37 C with a 3% H_2O_2 solution.

Virus inactivation was complete in 1 min. A 1.5% H_2O_2 solution had the same effect after 4 min, and a 0.75% solution after 6 min. H_2O_2 concentrations of 0.18% and 0.375% were ineffective even after 15 min. There was no difference in response between simplex 1 and simplex 2. Very concentrated virus suspensions were inactivated after 6 min by 3% H_2O_2 and after 8 min by 1.5% H_2O_2. The fall in titer was logarithmic. (11 references)

5019 RELATIVE CONCENTRATIONS IN HUMAN SERA OF ANTIBODIES TO CROSS-REACTING AND SPECIFIC ANTIGENS OF HERPES SIMPLEX VIRUS TYPES 1 AND 2.

(Eng.) McClung, H. (Dept. Pathology, McMaster Univ., Hamilton, Ontario L8S 4JP, Canada); Seth, P.; Rawls, W. E. *Am J Epidemiol* 104(2): 192-201; 1976.

The relative concentrations of antibodies to the cross-reacting and type-specific antigens of herpes simplex virus types 1 and 2 were examined in 143 serum samples from patients who had been infected by type 1 and/or type 2 virus. Complement-dependent lysis of ^{51}Cr-labeled cells was used to measure antibodies to the surface antigens of infected cells. Approximately 80% of the antibody activity was attributable to cross-reacting antigens and 20% to type-specific antigens in sera from patients infected with either type 1 or type 2 virus. Among patients infected with type 1 virus and then type 2 virus, approximately 90% of the antibody activity was to the cross-reacting antigens, 5% to 10% to type 1-specific antigens and little or no antibody to type 2-specific antigens. It is suggested that infection by type 2 virus in patients with a prior type 1 infection results in an antibody response to the cross-reacting antigens with little or no response to the type-specific antigens. (13 references)

5020 AN ATTEMPT TO ISOLATE HERPES SIMPLEX VIRUS IN PATIENTS WITH CANCER OF THE UTERINE CERVIX.

(Rus.) Movsesian, E. A. (Armenian Inst. Radiology and Oncology, Erevan, USSR); Kamalian, L. A.; Makhmurian, T. D.; Chshmaritian, Ch. S.; Melkumova, M. A. *Zh Eksp Klin Med* 15(5): 65-69; 1975.

Biopsy material and scrapings from the genitalia of patients with cancer of the uterine cervix and scrapings from control subjects were studied in an attempt to isolate herpes simplex virus. Of 103 individuals investigated, 41 had cancer of the uterine cervix, 32 had erosion of the uterine cervix, and 30 were healthy women. Almost all tests were conducted in cultures of fibroblasts of human and chicken embryo. Of the six agents isolated in tissue culture, only one, isolated from a patient with a histologic diagnosis of squamous-cell uterine cervical cancer, was neutralized by immune anti-herpes blood serum. The patient was examined prior to radiation treatment and showed no clinical signs of facial or genital herpes at that time. The findings emphasize the rarity of isolated herpes simplex virus in patients with cancer and erosion of the uterine cervix as well as in healthy subjects in the absence of clinical manifestations of genital herpes.

5021 CYTOPATHIC EFFECTS IN PRIMARY EPITHELIAL CULTURES DERIVED FROM THE HUMAN PROSTATE.

(Eng.) Webber, M. M. (Div. Urology, Dept. Surgery, Univ. Colorado Sch. Medicine, Denver, CO 80220). *Invest Urol* 13(4): 259-270; 1976.

Cytopathic effects in prostatic cells grown in vitro are described and compared with similar changes induced by known viruses. Normal, benign, and malignant human prostatic tissues were cultured in vitro. Light microscopy showed polykaryocyte formation, vacuolation, cytoplasmic bridges and processes, nuclear inclusions, increased acid phosphatase activity at the cell membrane of polykaryocytes compared to mononuclear cells, and cell rounding and clumping. Electron microscopy of the polykaryocytes showed nuclear membrane proliferation and protrusion, scarlike nuclear inclusion containing microfibrils, and viruslike particles similar to viral nucleoids and nucleocapsids. The latter were also observed in the cytoplasm. These alterations are similar to those induced by herpesviruses. Suggestive evidence that a latent viral agent may be present in prostatic cells is given, although to date no such agent has been isolated. Herpesvirus type 2 is proposed as the possible agent because the observed changes were similar to those induced by this virus. (42 references)

5022 IN VITRO TRANSFORMATION BY HSV-2 FROM A HUMAN PROSTATIC CANCER.

(Eng.) Centifanto, Y. M.; Kaufman, H. E. *In: Oncogenesis and Herpesviruses II. Part 2: Epidemiology, Host Response and Control. Proceedings of a Symposium held in Nuremburg, Federal Republic of Germany, 14-16 October 1974.* International Agency for Res. on Cancer. (Lyon, France): pp. 195-197; 1975.

Immunofluorescence assays and colony inhibition tests showed herpesvirus particles in the nuclei but not in the cytoplasm of transformed hamster embryo cells that had been inoculated with a cell-free homogenate from untreated human prostatic cancer. When transformed cells were injected with herpes simplex virus type 2 sensitized lymphocytes, no growth was observed after 72 hr. Newborn Syrian hamsters inoculated intrascapularly with 10^5 transformed cells showed enlargement of the testes at 8 wk, and HSV-2 antigens were demonstrated by immunofluorescence.

5023 ADENOVIRUS DNA: TRANSCRIPTION DURING PRODU TIVE INFECTION, INTEGRATION IN TRANSFORMED CELLS, AND REPLICATION IN VITRO.

(Eng.) Green, M.; Yamashita, T.; Buttner, W.; Fujinaga, K.; Arens, M.; Brackmann, K.; Loni, M. C. *In: Tumor Virus-Host Cell Interaction.* Edited by A. Kolber. (New York: Plenum Press): pp. 217-236; 1975.

The early and late transcription of the adenovirus 2 genome during productive infection in human KB cells was analyzed by hybridization of RNA in excess with radioactive viral L and H strands of DNA. Short after infection, transcription of the equivalent of the entire viral DNA genome by cellular enzymes gave two populations of viral RNA: abundant viral RNA transcripts representing 14%-16% of the viral genome; and scarce viral RNA sequences, presumably short-lived precursors to viral RNA. Transcription of the entire viral genome and conservation of specific mRNA molecules apparently present a cellular mechanism for regulating gene expression. The pattern of viral gene transcription changed dramatically when late viral genes began to function. About 80% of viral DNA sequences of the L strand and only 10%-20% of the H strand were transcribed at 9-36 hr. These RNA transcripts were of high abundance and represented the virally imposed regulation of gene transcription. Two major homogeneous early viral mRNA species of molecular wt 0.74 and 0.76 x 10^6 and smaller amounts of 15-18S and 21-26S broad viral RNA peaks were isolated by hybridization with and elution from L and H DNA strands. The number of copies and the fraction of the viral genome in cells transformed by human adenovirus 7 and 12 were estimated by measuring the early reassociation kinetics of denatured viral DNA in the presence of unlabeled transformed cell DNA. About 300 copies of about 15%-20% of the viral genome were found in adenovirus 7-transformed cells and about 50 copies of about 50% of the genome were found in adenovirus 12-transformed cells. Nuclear membrane fractions containing newly synthesized viral DNA were isolated from adenovirus 2-infected KB cells late after infection. Two polypeptides (of molecular wt 75,000 and 45,000) not detected in similar preparations from uninfected KB cells were associated with these fractions. A nuclear membrane complex synthesized short viral DNA fragments in vitro.

5024 RETINOBLASTOMA: VIRUS-INDUCED RETINAL TUMORS.

(Eng.) Mukai, N. (Eye Res. Inst. of Retina Foundation, Dept. Neuropathology, Harvard Medical Sch., Boston, MA 02114). *Jpn J Ophthalmol* 19(1): 94-101; 1976.

A linear cause-and-effect relationship between a human DNA virus, adenoserotype 12, and malignant transformation in retinal sensory neuronic precursor cells was established by the experimental induction of uniform retinoblastomalike neoplasms in rats. Within 73 to 167 days after a single, direct intraocular injection of virus-containing fluid, 44.4% of the animals developed retinal tumors in the inoculated eyes. No transitional features between malignant cells and normally forming retinal tissues were observed in newborn rats, but 3-day-old animals did exhibit cases of malignant cells fusing with relatively well-differentiated retinal layers. Transformed cells showed a marked propensity to take up fluorescein-labeled antibody specific for the virus. Electron microscopy revealed poorly differentiated tumor cells possessing a single cilium with a 9 + 0 tubule pattern. No preferential involvement of the photoreceptor cells was observed. No control animals developed retinal tumors. (20 references)

5025 PREVENTION OF EPSTEIN-BARR VIRUS (EBV)-INDUCED INFECTION IN COTTON-TOPPED MARMOSETS BY HUMAN SERUM CONTAINING EBV NEUTRALIZING ACTIVITY.

(Eng.) Shope, T. C. *In: Oncogenesis and Herpesviruses II. Part 2: Epidemiology, Host Response and Control. Proceedings of a Symposium held in Nuremburg, Federal Republic of Germany, 14-16 October 1974.* International Agency for Res. on Cancer. (Lyon, France): pp. 153-159; 1975.

Wild-reared cotton-topped marmosets (*Saguinus oedipus*) were injected with 10^4-10^5 transforming units of Epstein-Barr virus (EBV), and 5 of 17 developed intra-abdominal lymphadenopathy that did not progress to malignant lymphoma. Nodules, occurring singly but more often in chains of five or six, increased in size to a maximum of 1 x 0.5 cm and then decreased until they disappeared in three of four animals within 95 days. Antibodies appeared on day 33 and persisted for 4.5 mo. Animals given $10^{4.3}$ transforming units developed intra-abdominal lymphadenitis and viremia; all animals had EBV capsid antibody within 2 wk. Animals given neutralized virus developed no symptoms, but all developed antibodies when given the virus 16 wk later. The results indicate that lymphoproliferative disease develops in these animals but differs from infectious mononucleosis in humans as follows: viremia disappears with the presence of antibody; the spleen does not appear to be involved; no heterophile agglutinin responses are involved; and no change in the peripheral blood leukocyte is observed.

5026 A QUANTITATIVE ANALYSIS OF THE SUSCEPTIBILITY OF HUMAN LEUKOCYTES TO TRANSFORMATION BY EPSTEIN-BARR VIRUS.

(Eng.) Katsuki, T. (Dept. Microbiology, Kumamoto Univ. Medical Sch., Kumamoto, 860, Japan); Hinuma, Y. *Int J Cancer* 18(1): 7-13; 1976.

The susceptibility of lymphocyte-enriched cell fractions isolated from human umbilical cord blood and adult peripheral blood to transformation by the B95-S strain of Epstein-Barr virus (EBV) was investigated quantitatively. Minimum multiplicity of infection, MOI (50% transforming dose), per cell necessary to induce the maximum transformation level of cord cells ranged from 0.02 to 0.2. The number of initially transformed cells (fraction of transformable cells) in the cord cell samples from two different individuals was about 2.6%-6.2%. The appearance of cells positive for EBV-associated nuclear antigen (EBNA) paralleled the growth curve of transformed cells. About 70% of the latter were EBNA-positive. In adult cell preparations from two individuals, 1.8% and 0.03% of the cells were transformable, indicating larger individual variations in sensitivity to EBV than in cord cells. The EBV susceptibility was also determined by the transforming efficiency (TE) expressed as the negative log of the virus dilution that induces transformation in 50% of cell cultures infected at an MOI of 0.2. From the TE value, a minimum MOI that induces transformation could be calculated. Also, by this test it was shown that the EBV susceptibility of adult cells was not only lower but also much more variable between individuals than that of cord cells. There was no correlation between the susceptibility of cells and the titer of anti-EBV antibody in donors' sera. In cultures of mixed cord cells and adult cells known to have low EBV susceptibility, the minimum MOI increased in proportion to the amount of adult cells. (25 references)

5027 FURTHER STUDIES ON THE DETECTION OF THE EPSTEIN-BARR VIRUS DNA IN NASOPHARYNGEAL CARCINOMA BIOPSIES FROM DIFFERENT PARTS OF THE WORLD. (Eng.) Desgranges, C.; De-The, G.; Wolf, H.; zur Hausen, H. *In: Oncogenesis and Herpesviruses II. Part 2: Epidemiology, Host Response and Control. Proceedings of a Symposium held in Nuremburg, Federal Republic of Germany, 14-16 October 1974.* International Agency for Res. on Cancer. (Lyon, France): pp. 191-193; 1975.

To determine whether Epstein-Barr virus DNA (EBV DNA) was present in lymphocytes found in nasopharyngeal carcinoma (NPC), hybridization experiments were performed on DNA from NPC tumor biopsies from Nairobi, Singapore, and Tunisia. Hybridization of lymphocyte DNA with EBV complementary RNA was barely significant, but the epithelial fraction possessed a high count. Variations regarding pathology, serology, and geographical areas are now being analyzed.

5028 OBSERVATIONS ON THE NATURE OF EPSTEIN-BARR VIRUS INFECTION OF PERIPHERAL LYMPHOID CELLS IN INFECTIOUS MONONUCLEOSIS. (Eng.) Rickinson, A. B.; Jarvis, J. E.; Crawford, D. H.; Epstein, M. A. *In: Oncogenesis and Herpesviruses II. Part 2: Epidemiology, Host Response and Control. Proceedings of a Symposium held in Nuremburg, Federal Republic of Germany, 14-16 October 1974.* International Agency for Res. on Cancer. (Lyon, France): pp. 169-177; 1975.

Lymphocytes from antibody-positive infectious mononucleosis (IM) donors were cultured with fetal leukocytes from opposite sex donors, which resulted in the ready transformation of the fetal cells. The transformation ability remained when the IM leukocytes were irradiated either immediately after collection or after 0-2 days in culture or when antiserum to Epstein-Barr virus (EBV) or EBV-negative serum was added. This indicated that a factor is involved in the transformation that can be transmitted in the presence of antiserum, an event similar to other herpesvirus infections. It is suggested that all seropositive, lymphoma-free individuals carry a small proportion of IM leukocytes with EBV.

5029 REPLICATION OF MYCOPLASMAVIRUS MVL51. IV. INHIBITION OF VIRAL SYNTHESIS BY RIFAMPIN. (Eng.) Das, J. (Dept. Physics, Calcutta Univ., Calcutta, India); Maniloff, J. *J Virol* 18(3): 969-976; 1976.

The effect of rifampin on the replication of MVL51 was examined in the rifampin-resistant host cell *Acholeplasma laidlawii* JA1. Rifampin did not block the early steps in MVL51 infection but did decrease the total amount of parental viral DNA taken up. The single-stranded parental viral DNA that entered the cell was found in membrane-associated, double-stranded DNA replicative forms I and II. Rifampin had no significant effect on the synthesis of progeny viral DNA RFI and RFII early in infection and SSI (single-stranded progeny viral chromosomes) later in infection. The rifampin block in virus synthesis was found to be in the step converting SSI into assemble virions. Rifampin was shown to affect the synthesis of virus-specific RNA, which suggests that viral transcription is necessary for virion assembly. The reason for this sensitivity might be that a viral gene product or a cellular virus-specific factor could modify the cells' RNA polymerase, or the viral transcription complex could be different from that of the cell.

5030 PROCESSING OF MENGOVIRUS PRECURSOR POLYPEP TIDES IN THE PRESENCE OF ZINC IONS AND SULFHYDRYL COMPOUNDS. (Eng.) Nakai, K. (Osaka City Univ., Sch. Medicine, Osaka, Japan); Lucas-Lenard, J. *J Virol* 18(3): 918-925; 1976.

The effect of zinc ions on the post-translational cleavage of mengovirus polypeptides was examined. L cells, strain 929, were infected with mengovirus at a multiplicity of infection of 20 PFU/cell and labeled with radioactive amino acids, and acrylamide gel electrophoresis of the viral proteins was performed. Zinc chloride was added at various concentrations during the preincubation, labeling, or chase periods. The cleavage of the "A" precursor, which gives rise to the capsid proteins, was the most sensitive at concentrations of zinc chloride from 0.1 to 1.0 mM but a precursor slightly larger than A was also sensitive. β-Mercaptoethanol and dithiothreitol antagonized the zinc-promoted inhibi tion of cleavage. The results indicate that zinc ions interfered with proper folding of the nascent polypeptide precursor rather than inhibited the proteases responsible for the cleavages. Thus, prop folding of mengovirus polypeptide A appears to be necessary for subsequent processing by proteases.

5031 RELEASE OF XENOTROPIC TYPE C RNA VIRUS I RESPONSE TO LIPOPOLYSACCHARIDE: ACTIVITY OF LIPID-A PORTION UPON B LYMPHOCYTES. (Eng.) Phillips, S. M. (Sch. Medicine, Univ. Pennsylvania, Philadelphia, PA 19174); Stephenson, J. R.; Greenberger, J. S.; Lane, P. E.; Aaronson, S. A. *J Imm* 116(4): 1123-1128; 1976.

Lipopolysaccharide (LPS) caused the release of endogenous xenotropic type-C RNA virus from BALB/c spleen cells. Virus release was apparently stimula by the lipid A portion of LPS and primarily involv an action of LPS on B lymphocytes. LPS had little no effect on virus release by T lymphocytes, macro phages, or fibroblasts. The differentiated state o the cell plays an important role in the regulation of endogenous virus release.

5032 ISOLATION OF INFECTIOUS C TYPE ONCORNAVI FROM HUMAN LEUKEMIC BONE MARROW CELLS. (Eng.) Nooter, K. (Radiobiological Inst. TNO, Lang Kleiweg 151, Rijswijk, The Netherlands); Aarssen, M.; Bentvelzen, P.; de Groot, F. G.; van Pelt, F. G. *Bibl Haematol* (43): 574-575; 1976.

A type C oncornavirus was isolated from a child with generalized lymphosarcoma. Bone marrow taken before the child was treated was cultured in the presence of phytohemagglutinin. After 3 days, type C particles were found in the supernatant. Virus production, as demonstrated by electron microscopy or reverse transcriptase assay and syncytium formation, continued for five passages in the infected XC cells, but decreased greatly thereafter. Human embryonic fibroblasts, which were negative in the reverse transcriptase assay, produced virus after 4 wk exposure to cell-free supernatants of infected XC cells. Virus production was also demonstrated while the child was in remission after chemotherapy. The possibility that the virus was a laboratory contaminant was rejected. (2 references)

5033 ELECTRON MICROSCOPE STUDIES OF TUMOR VIRUS RNA. (Eng.) Kung, H. J.; Bailey, J. M.; Davidson, N.; Vogt, P. K.; Nicolson, M. O.; McAllister, R. M. *In: Tumor Viruses. Cold Spring Harbor Symposia on Quantitative Biology*. Cold Spring Harbor Lab. (Cold Spring Harbor, NY); vol. 39, pp. 827-834; 1975.

Electron microscopy was used to study the molecular structures of the RNA of several tumor viruses (Rous sarcoma virus, RSV; feline leukemia virus, FeLV; D-114). The glyoxal-formamide technique and the urea-formamide spreading solution at low electrolyte concentration were used to spread the RNA molecules. he glyoxal treatment appeared to dissociate the RSV 0S RNA complex, although many of the 35S subunit olecules contained internal breaks. The denaturing radient containing glyoxal was more effective than simple sucrose gradient in fractionating molecules ccording to size. The average molecular length for he 35S RSV RNA corresponded to a molecular wt f 3.28 x 10^6 daltons; the molecular wt of the 5S RNA from transformation-defective variants of SV was 2.94 x 10^6 daltons. Like RSV, the 70S comlex from the Gardner-Arnstein strain of FeLV gave xtended RNA molecules when denatured with glyoxal. he average molecular wt was 3.27 x 10^6 daltons. he large components of RD-114 showed unusual features hen compared to the RNAs of RSV and FeLV: the verage molecular wt was 5.05 x 10^6 daltons, and n the otherwise smooth and well-extended molecules n the urea-formamide spreading, there was a characeristic T- or Y-shaped secondary structure feature SSF) located 0.46 fractional length from one end of he molecule (or more off-center in smaller molecules) hat contained about 900 nucleotides. The SSF was ess common among the molecules spread by the glyoxal ethod. The results suggest that all of the viral nformation of RSV is encoded in a molecule 9.5 x 0^3 nucleotides long, whereas RD-114 appears to have genome consisting of one or more molecules 1.5 x 0^4 nucleotides long. (23 references)

034 INHIBITION OF MAMMALIAN AND ONCORNAVIRUS NUCLEIC ACID POLYMERASE ACTIVITIES BY LKOXYBENZOPHENANTHRIDINE ALKALOIDS. (Eng.) Sethi, V. S. (Dept. Virology and Cell Biology, Litton Bionetics, Inc., Kensington, MD 20795). *Cancer Res* 36(7): 2390-2395; 1976.

The alkoxybenzophenanthridine alkaloids (coralyne acetosulfate, fagaronine chloride, and nitidine chloride) have been reported to possess antileukemic activity in mice. These compounds were tested for inhibition of the reverse transcriptase activity of an RNA tumor virus and the DNA polymerase, RNA polymerase, and polyadenylic acid polymerase activities of NIH-Swiss mouse embryos. Reverse transcriptase and DNA polymerase activities were strongly inhibited by these antileukemic alkaloids, whereas RNA polymerase and polyadenylic acid polymerase activities were only moderately affected. Viral and cellular DNA polymerase activities were potently diminished by the alkaloids when poly[d(A-T)], poly(dA)•oligo(dT), and poly(rA)•oligo(dT) template primers were used in the reaction mixture; however, no inhibition of enzyme activity was obtained with poly(rC)•oligo(dG) as template primer. These results suggest that the alkaloids inhibit DNA polymerase activity by interaction with A:T base pairs of the template primer. Several antitumor drugs inhibit DNA polymerase reactions when template primers with A:T pairs are used. This suggests a stronger or preferential binding of these drugs to A:T regions that may be related to the differential fluorescent staining of chromosomes by these drugs and indicates that the preferential inhibition of DNA polymerase activity using A:T template primers may be useful in screening antitumor compounds. (25 references)

5035 COMPARISON OF LECTIN BINDING SITE TOPOGRAPHY AND CYTOAGGLUTINATION OF NORMAL AND ONCORNAVIRUS INFECTED CELLS (Meeting Abstract). (Eng.) Hixson, D. C. (Univ. Texas System Cancer Center, Houston, TX); Miller, M. F.; Maruyama, K. *J Cell Biol* 67(2/Part 2): 173a; 1975.

5036 CHANGES IN MITOCHONDRIAL DNA REPLICATION IN CELLS TRANSFORMED BY ROUS SARCOMA VIRUS (Meeting Abstract). (Eng.) D'Agostino, M. A. (Univ. Pennsylvania, Sch. Medicine, Philadelphia, PA 19174); Nass, M. M. *J Cell Biol* 67(2/Part 2): 83a; 1975.

5037 SCANNING ELECTRON MICROSCOPIC STUDIES ON INFLUENZA VIRUS AND RS VIRUS (Meeting Abstract). (Eng.) Tawara, J. (Okayama Univ. Medical Sch., Okayama, Japan); Uno, F.; Ueba, O. *J Electron Microsc (Tokyo)* 24(3): 204; 1975.

5038 INTRACELLULAR DISTRIBUTION OF PLASMINOGEN ACTIVATOR FROM TRANSFORMED CELLS (Meeting Abstract). (Eng.) Quigley, J. P. (SUNY-Downstate Medical Center, Brooklyn, NY). *J Cell Biol* 67(2/Part 2): 347a; 1975.

5039 CHICKEN EGG YOLK ENHANCES FOCUS FORMATION BY SUBGROUP B, C AND D ROUS SARCOMA VIRUSES. (Eng.) Sandelin, K. (Dept. Virology, Univ. Helsinki SF-00290, Helsinki 29, Finland). *J Gen Virol* 32: 109-120; 1976.

5040 NUCLEAR AND CYTOPLASMIC PROTEIN CHANGES IN NRK CELLS TRANSFORMED BY A TEMPERATURE-SENSITIVE MUTANT OF ROUS SARCOMA VIRUS (TS339) (Meeting Abstract). (Eng.) Magun, B. (Dept. Anatomy, Univ. Tennessee CHS, Memphis, TN). *J Cell Biol* 67 (2/Part 2): 255a; 1975.

5041 ELECTRON MICROSCOPIC STUDY OF ROUS SARCOMA VIRUS GENOME RNA AND ITS HEAT DISSOCIATED SUBUNIT MOLECULES (Meeting Abstract). (Eng.) Kanzaki, Y. (Okayama Univ. Medical Sch., Okayama, Japan); Hatase, O.; Ishii, H.; Oda, T.; Suhara, G. *J Electron Microsc (Tokyo)* 24(3): 204; 1975.

5042 HEREDITARY MODIFICATIONS OF AVIAN SARCOMA VIRUSES BY QUAIL CELL PASSAGES. (Eng.) Toyoshima, K. (Res. Inst. Microbial Diseases, Osaka Univ., Yamada-kami, Suita, Osaka, Japan); Nomaguchi, H.; Owada, M.; Ihara, S.; Yoshida, M. *Bibl Haematol (Basel)* (43): 453-455; 1976.

5043 GENETIC CONTROL OF FRIEND VIRUS-TRANSFORMED COLONY-FORMING CELLS BY THE *FV-2* RESISTANCE GENE IN MICE. (Eng.) Steeves, R. A. (Dept. Developmental Biology and Cancer, Albert Einstein Coll. Medicine, Bronx, NY 10461); Blank, K. J.; Lilly, F. *Bibl Haematol (Basel)* (43): 151-153; 1976.

5044 INHIBITION OF MOUSE SPLEEN RNA POLYMERASE I AND II BY PARTIALLY THIOLATED POLYCYTIDYLATE (Meeting Abstract). (Eng.) Munson, B. R. (Roswell Park Memorial Inst., Buffalo, NY 14263). *Proc Am Assoc Cancer Res* 17: 157; 1976.

5045 THE CELL SURFACE IN FRIEND CELL DIFFERENTIATION (Meeting Abstract). (Eng.) Bernstein, A. (Ontario Cancer Inst., Toronto, Canada). *J Gen Physiol* 66(6): 4a; 1975.

5046 THE SPLEEN IN FRIEND LEUKEMIA. II. NONLEUKEMIC NATURE OF SPLEEN STROMA. (Eng.) Levy, S. B. (Dept. Medicine (Hematology), Tufts-New England Medical Center, Boston, MA 02111); Rubenstein, C. B.; Tavassoli, M. *J Natl Cancer Inst* 56(6): 1189-1195; 1976.

5047 VIRAL STIMULATION OF CHOLINE PHOSPHOTRANSFERASE IN SPLEEN MICROSOMES DURING PRODUCTION OF MALIGNANCY. (Eng.) Cornatzer, W. E.; Hoffman, D. R.; Skurdal, D. *In: Cancer Enzymology.* Schultz, J.; Ahmad, F., eds. (New York: Academic Press, Inc.): p. 336; 1976.

5048 AN ULTRASTRUCTURAL STUDY OF VIRION PRODUCTION IN SYNCHRONOUS CULTURES OF JLSV-9 CELLS CHRONICALLY INFECTED WITH MOLONEY LEUKEMIA VIRUS (Meeting Abstract). (Eng.) Luftig, R. B. (Worcester Foundation, Shrewsbury, MA); Bedigian, E. P.; Paskind, M. P.; Weinberg, R. A. *J Cell Biol* 67(2/Part 2): 250a; 1975.

5049 MOUSE CELLULAR RESTRICTION OF XENOTROPIC STRAIN OF MURINE LEUKEMIA VIRUS (Meeting Abstract). (Eng.) Gazdar, A. (NCI, Bethesda, MD); Lemons, R.; Russell, E.; Minna, J. *J Cell Biol* 67 (2/Part 2): 131a; 1975.

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5051 CONSEQUENCES OF THE TWO-VIRUS STATUS OF THE NATURAL MOUSE LYMPHATIC LEUKEMIA VIRUSES (Meeting Abstract). (Eng.) Haas, M. (Dept. Chemical Immunology, Weizmann Inst. Science, Rehovo Israel). *Isr J Med Sci* 11(12): 1293; 1975.

5052 MURINE LEUKEMIA VIRUS GROUP-SPECIFIC ANTI GEN ABSENCE IN PREIMPLANTATION EMBRYOS OF THE MOUSE (Meeting Abstract). (Eng.) Calarco, P. G. (Dept. Anatomy, Univ. California, San Francisco, CA); Spindle, A. I.; Tasca, R. J. *J Cell Biol* 67 (2/Part 2): 52a; 1975.

5053 CELL SURFACE MEMBRANE ALTERATIONS DURING MURINE LEUKEMIA VIRUS MORPHOGENESIS (Mee ing Abstract). (Eng.) Demsey, A. (Memorial Sloan-Kettering Cancer Center, Rye, NY); Stackpole, C. W *J Cell Biol* 67(2/Part 2): 92a; 1975.

5054 LEUCINE METABOLISM IN NORMAL AND VIRUS TRANSFORMED MOUSE FIBROBLASTS (Meeting Abstract). (Eng.) Neff, N. (Lab. Chemical Biodynam Univ. California, Berkeley, CA); Ross, P.; Barthol omew, J.; Bissell, M. J. *J Cell Biol* 67(2/Part 2) 304a; 1975.

5055 ALTERED MICROFILAMENT STRUCTURE DURING CELLULAR TRANSFORMATION BY MURINE SARCOM VIRUS (Meeting Abstract). (Eng.) Altenburg, B. (Ba lor Coll. Medicine, Houston, TX); Steiner, S. *J Ce Biol* 67(2/Part 2): 7a; 1975.

5056 RESCUE OF A RAT TROPIC VIRUS BY CO-CULTI TION OF RAT HEPATOMA TISSUE CULTURE (HT CELLS WITH KIRSTEN MURINE SARCOMA VIRUS (MSV) TRAN FORMED NONPRODUCER RAT KIDNEY (K-NRK) (Meeting Abstract). (Eng.) Yang, S. S. (NCI, Bethesda, MD 20 Chan, C. C.; Thompson, E. B. *J Cell Biol* 67(2/Par 2): 467a; 1975.

5057 GENETIC CONTROL OF ONCOGENESIS BY MURIN SARCOMA VIRUS MOLONEY PSEUDOTYPE. III. POSSIBLE CORRELATION WITH ENDOGENOUS VIRUS PRODUCTION. (Eng.) Colombatti, A. (Lab. Experimental On gy, Inst. Pathological Anatomy, Univ. Padova, Via Gabelli, 35, I-35100 Padova, Italy); Collavo, D.; Biasi, G.; Chieco-Bianchi, L. *Bibl Haematol (Base* (43): 448-450; 1976.

5058 PROPERTIES OF A RAT-ADAPTED MURINE SARCOMA VIRUS (MOLONEY) --SIZE DETERMINATION BY ELECTRON MICROSCOPY (Meeting Abstract). (Eng.) Hanaichi, T. (Aichi Cancer Center Res. Inst., Nagoya, Japan); Kano-Tanaka, K.; Tanaka, T. *J Electron Microsc (Tokyo)* 24(3): 204; 1975.

5059 PROPERTIES OF MOLONEY SARCOMA VIRUS-SPECIFIC P60 AND ITS DETECTION IN TRANSFORMED CELLS. (Eng.) Woude, G. F. (Viral Biology Branch, NCI, Bethesda, MD 20014); Robey, W. G.; Oskarsson, M. K.; Haapala, D. K.; Fischinger, P. J.; Naso, R. B.; Arlinghaus, R. B. *Bibl Haematol (Basel)* (43): 125-127; 1976.

5060 BIOPHYSICAL AND BIOCHEMICAL CHARACTERISTICS OF FELINE AND SIMIAN ONCORNAVIRUSES (Meeting Abstract). (Eng.) Hoekstra, J. A. (Univ. Illinois at Medical Center, Chicago, IL). *Diss Abstr Int [B]* 36(6): 2626; 1975.

5061 FELINE LEUKEMIA VIRUS INDUCED DISORDERS IN THE CAT.. (Eng.) Cotter, S. M. (Angell Memorial Animal Hosp., Dept. Internal Medicine, Boston, MA). *Vet Clin North Am* 6(3): 367-378; 1976.

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064 MOUSE MAMMARY TUMOR VIRUS DNA POLYMERASE: PURIFICATION AND PROPERTIES (Meeting Ab-tract). (Eng.) Marcus, S. L. (No affiliation given); arkar, N. H.; Modak, M. J. *J Cell Biol* 67(2/Part): 258a; 1975.

065 IDENTIFICATION OF MOUSE MAMMARY TUMOR VIRUS (MMTV) POLYPEPTIDE PRECURSORS IN NTRACYTOPLASMIC A PARTICLES (Meeting Abstract). Eng.) Smith, G. H. (NCI, Bethesda, MD 20014); Lee, . K. *J Cell Biol* 67(2/Part 2): 407a; 1975.

066 THE EFFECT OF TRYPSIN ON THE MOUSE MAMMARY TUMOR VIRUS (Meeting Abstract). (Eng.) heffield, J. B. (Inst. for Medical Res., Camden, J); Zacharchuk, C. M.; Daly, T. M.; Taraschi, N.; oore, D. H. *J Cell Biol* 67(2/Part 2): 394a; 1975.

5067 ACCUMULATION OF MONONUCLEAR CELLS AND GROWTH-SLOWING OF SV-40 HAMSTER FIBROSARCOMAS FOLLOWING INTRA-TUMOR INJECTION OF BRADYKININ (Meeting Abstract). (Eng.) Koppelmann, L. E. (Depts. Pathology and Surgery, Westwood Harbor General Hosp. Campuses, UCLA Sch. Medicine, Los Angeles, CA); Moore, T. C.; Lemmi, C. A.; Porter, D. D. *Agents Actions* 6(4): 430-431; 1976.

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5069 INDUCTION OF CONCANAVALIN A AGGLUTINABILITY OF 3T3 CELLS BY SV40-3T3 CELL PLASMINOGEN ACTIVATOR (Meeting Abstract). (Eng.) Whur, P. (Marie Curie Memorial Foundation, Oxted, Surrey, England); Koppel, H.; Urquhart, C.; Williams, D. C. *Br J Cancer* 34(3): 312; 1976.

5070 PYRIDINE NUCLEOTIDE LEVELS AS A FUNCTION OF GROWTH IN NORMAL AND TRANSFORMED 3T3 CELLS. (Eng.) Jacobson, E. L. (Dept. Chemistry, North Texas State Univ., Denton, TX 76203); Jacobson, M. K. *Arch Biochem Biophys* 175(2): 627-634; 1976.

5071 ONCORNAVIRUS GENETIC EXPRESSION: MURINE VIRUS GENE INDUCTION BY HUMAN CELL CHROMOSOMES. (Eng.) Strand, M. (Dept. Molecular Biology, Div. Biological Sciences, Albert Einstein Coll. Medicine, Bronx, NY 10461); August, J. T.; Croce, C. M. *Bibl Haematol (Basel)* (43): 97-101; 1976.

5072 SIGNIFICANCE OF SPECIFIC TRANSPLANTATION ANTIGEN EXPRESSION AT THE SURFACE OF PAPOVAVIRUS SV40-INFECTED PERMISSIVE CELLS. (Eng.) Tevethia, S. S. (Dept. Pathology and Cancer Res. Center, Tufts Univ. Sch. Medicine, 136 Harrison Ave., Boston, MA 02111); Tevethia, M. J. *Bibl Haematol (Basel)* (43): 74-77; 1976.

5073 IDENTIFICATION OF MONONUCLEAR CELL POPULATION CARRYING *HERPESVIRUS SAIMIRI* (HVS) IN PERSISTENTLY-INFECTED SQUIRREL MONKEYS (SM) AND MARMOSETS (Meeting Abstract). (Eng.) Wright, J. (Dept. Microbiology, Rush-Presbyterian-St. Luke's Medical Center, Chicago, IL). *Clin Res* 24(4): 600A; 1976.

5074 BIPHASIC STIMULATION OF POLYAMINE BIOSYNTHESIS IN PRIMARY MOUSE KIDNEY CELLS BY INFECTION WITH POLYOMA VIRUS (Meeting Abstract). (Eng.) Heby, O. (Brain Tumor Res. Center, Dept. Neurological Surgery, Univ. California, San Francisco, CA 94143); Marton, L. J.; Goldstein, D. A. *J Cell Biol* 70(2/Part 2): 376a; 1976.

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5076 THE STATE OF FREE VIRAL DNA IN RAT CELLS TRANSFORMED BY POLYOMA VIRUS (Meeting Abstract). (Eng.) Prasad, I. (Dept. Pathology, New York Univ. Sch. Medicine, New York, NY 10016); Zouzias, D.; Basilico, C. *J Cell Biol* 70(2/Part 2): 67a; 1976.

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5078 ULTRASTRUCTURE OF AN EXPERIMENTALLY (JC PAPOVAVIRUS) INDUCED PINEOCYTOMA OF A SYRIAN HAMSTER (Meeting Abstract). (Eng.) Varakis, J. N. (Univ. Wisconsin Medical Sch., Madison, WI); Zu Rhein, G. M. *J Neuropathol Exp Neurol* 35(1): 103; 1976.

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5080 ISOLATION OF AN INTRACELLULAR NUCLEOPROTEIN COMPLEX FROM ADENO ASSOCIATED VIRUS INFECTED CELLS (Meeting Abstract). (Eng.) Young, J. F. (Dept. Microbiology, Baylor Coll. Medicine, Houston, TX 77030); Mayor, H. D. *J Cell Biol* 70(2/Part 2): 369a; 1976.

5081 CHARACTERIZATION OF ADENOVIRUS TYPE 2 TRANSCRIPTIONAL COMPLEXES ISOLATED FROM INFECTED HELA CELL NUCLEI. (Eng.) Wilhelm, J. (Unite de Recherche sur le Cancer de l'INSERM, 67085 Strasbourg, France); Brison, O.; Kedinger, C.; Chambon, P. *J Virol* 19(1): 61-81; 1976.

5082 THE PHYSICAL STRUCTURE OF THE HERPES SIMPLEX VIRUS GENOME (Meeting Abstract). (Eng.) Clements, J. B. (Inst. Virology, Univ. Glasgow, Church St., Glasgow G11 5JR, Scotland). *Heredity (Lond)* 36(2): 288; 1976.

5083 A RE-EVALUATION OF HUMAN ADENOVIRUS-PRODUCED INTRAPERITONEAL TUMOR PHENOTYPE IN RODENTS (Meeting Abstract). (Eng.) Mukai, N. (Eye Res. Inst. Retina Foundation, Boston, MA); Murao, T. *J Neuropathol Exp Neurol* 35(1): 101-102; 1975.

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5085 ADENOVIRUS TRANSCRIPTION. III. MAPPING OF VIRAL RNA SEQUENCES IN CELLS PRODUCTIVELY INFECTED BY ADENOVIRUS TYPE 5. (Eng.) Flint, S. J. (Center for Cancer Res., Massachusetts Inst. Technology, 77 Massachusetts Ave., Cambridge, MA 02139); Berget, S. M.; Sharp, P. A. *Virology* 72(2): 443-455; 1976.

5086 INVERTED REPETITIONS IN THE CHROMOSOME OF HERPES SIMPLEX VIRUS. (Eng.) Sheldrick, P.; Berthelot, N. *In: Tumor Viruses. Cold Spring Harbor Symposia on Quantitative Biology.* Cold Spring Harbor Laboratory. (Cold Spring Harbor, NY): vol. 39, pp. 667-678; 1975.

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5088 COMMON ANTIGENS OF HERPES SIMPLEX VIRUS 2, ASSOCIATED HAMSTER TUMORS, AND HUMAN CERVICAL CANCER. (Eng.) Ibrahim, A. N. (Dept. Biology, Georgia State Univ., Atlanta, GA 30303); Ray, M.; Megaw, J.; Brown, R.; Nahmias, A. J. *Proc Soc Exp Biol Med* 152(3): 343-347; 1976.

5089 ONCOGENIC TRANSFORMATION OF MAMMALIAN CELLS IN VITRO BY PROFLAVINE-PHOTOINACTIVA HERPES SIMPLEX VIRUS TYPE 2. (Eng.) Li, J.-L. (Dept. Microbiology, Milton S. Hershey Medical Center, Pennsylvania State Univ., Coll. Medicine, Hershey, PA 77033); Rapp, F. *Cancer Lett (Amsterdam)* 1(6): 319-326; 1976.

5090 REPLICATION OF EB VIRUS IN MALIGNANT EPITHELIAL CELLS FROM NASOPHARYNGEAL CARCINOM (NPC) (Meeting Abstract). (Eng.) Trumper, P. A. (Univ. Dept. Pathology, Medical Sch., Bristol, England); Epstein, M. A. *Br J Cancer* 34(4): 317-318; 1976.

5091 ASSESSMENT OF SURFACE MARKERS OF HUMAN LYMPHOBLAST CELL LINES AND EPSTEIN-BARR VIRUS (EBV) GENOME (Meeting Abstract). (Eng.) Yount W. (Dept. Medicine, Univ. North Carolina, Chapel Hill, NC 27514); Utsinger, P.; Hutt, L.; Buchanan, P.; Korn, J.; Pagano, J. *Clin Res* 24(3): 339A; 1976

See also:

* (Rev): 4820, 4822, 4823, 4824, 4825, 4826,
4827, 4828, 4851, 4852, 4865, 4867,
4868, 4869, 4872
* (Phys): 4979
* (Immun): 5095, 5107, 5108, 5109, 5114, 51
5119, 5121, 5126, 5130, 5138, 51
* (Path): 5235
* (Epid-Biom): 5305, 5322

5092 ENZYMATIC REMOVAL OF H-2 ALLOANTIGENS FROM THE SURFACE OF P815-(X2) MOUSE TUMOR CELLS.

(Eng.) Thomas, K. (Res. Dept. FPZ, Hoffmann-La Roche and Co., Ltd., CH-4002 Basel, Switzerland); Engers, H. D.; Cerottini, J.-C.; Brunner, K. T. *Eur J Immunol* 6: 257-262; 1976.

The effects of two proteolytic enzymes on mouse ascites tumor cells were analyzed with regard to the possible removal of surface alloantigens and the subsequent susceptibility to lysis by antibody and complement or cytotoxic T lymphocytes (CTL). After treatment with papain (6 mg/ml) for 1 hr, P815 tumor cells became resistant to complement-mediated lysis by mouse alloantibodies of different specificities. Immunofluorescence and absorption studies indicated that this resistance was associated with removal of the corresponding antigenic determinants from the cell surface. In contrast, papain-treated tumor cells were fully susceptible to lysis by rabbit antiserum against P815 cells, indicating no alteration of the membrane sensitivity to complement damage and a dissociation between the structure and/or localization of allo- and xenoantigens. Papain-treated cells were also completely resistant to lysis CTL during the first 60 min after treatment. Susceptibility to lysis by either CTL or alloantibody and complement reappeared within a few hours after incubation in culture medium and was virtually normal by 6 hr. Treatment of P815 cells with trypsin (2 mg/ml) had no effect on either humoral or cellular lytic activities. (20 references)

5093 ABSENCE OF THY-1 ANTIGEN IN L-CELL X MOUSE LYMPHOMA HYBRIDS.

(Eng.) Hyman, R. (Salk Inst. Biological Studies, P.O. Box 1809, San Diego, CA); Kelleher, R. J. *Somatic Cell Genet* 1(4): 335-343; 1975.

Hybrid clones arising after inactivated Sendai virus-mediated cell fusion between a bromodeoxyuridine-resistant derivative of a BALB/c mouse lymphoma cell line, S49, and a thioguanine-resistant derivative (A9) of a C3H mouse fibroblast cell line, L929, were selected in HAT medium. The responses of the clones to growth inhibitors as well as their chromosome numbers were consistent with properties expected of hybrids. Hybrid clones expressed the major histocompatibility (H-2) surface antigens of both parental types; ie., H-2d of BALB/c and H-2k of C3H. The Thy-1.2 antigen, expressed on the surface of the lymphoma parent but not the fibroblast parent, was not detected on the hybrids. Possible reasons for the suppression of the Thy-1.2 antigen in the hybrids are discussed. (27 references)

5094 THE EFFECT OF SPECIFIC ANTISERUM ON THE METABOLISM OF THREE MEMBRANE-ASSOCIATED ANTIGENS OF ASL-1 X LM(TK) HYBRID CELLS.

(Eng.) Liang, W. (La Rabida-Univ. Chicago Inst., Chicago, IL 60649); Cohen, E. P. *Somatic Cell Genet* 2(4): 291-307; 1976.

The metabolism of thymus leukemia (TL) antigens of ASL-1 x LM(TK) cell hybrids was studied in the presence and absence of TL antiserum. The hybrids failed to undergo modulation, the reversible disappearance of TL antigens from the surfaces of the cells that is stimulated by TL antiserum. Unlike ASL-1 cells, the rate of disappearance of the antigens from modulation-negative hybrid cells was unaffected by TL antiserum. The $t_{1/2}$ of the TL antigens of the hybrid was approximately 30 hr. The $t_{1/2}$ of TL antigens of ASL-1 cells was 10 hr in the presence of TL antiserum and 18 hr in the absence of TL antiserum. The metabolic rate of a putative tumor-associated antigen of ASL-1 cells formed by the hybrid was unaffected by exposure to specific antiserum, as was the metabolism of H-2 antigens formed by the cell types. (17 references)

5095 EFFECT OF CROSS-IMMUNIZATION ON MONOTYPIC ANTIBODY RESPONSES TO HERPES SIMPLEX VIRUS TYPES 1 AND 2.

(Eng.) Smith, J. W. (Lousiana State Univ. Medical Center, New Orleans, LA 70112); Glorioso, J. C. *J Immunol* 116(4): 898-903; 1976.

New Zealand White rabbits were immunized sc with partially purified UV-inactivated preparations of herpes simplex virus (HSV-1 or HSV-2) in complete Freund's adjuvant. Designated groups of immunized animals received additional amounts of either HSV-1 or HSV-2 at 35-day intervals. Sera were absorbed with lysates of cells infected with heterotypic virus. The residual monotypic antibodies were detected by ^{51}Cr-release assay using HSV-infected target cells. Antibodies monospecific for HSV-1 infected cell antigens appeared after one injection. Continued administration only heightened the amount of monotypic activity after absorption of HSV-2-infected cells was detected. Rabbits given multiple HSV-1 injections and a single HSV-2 injection did show monotypic responses to HSV-2. A positive correlation was found between the ratio of neutralizing antibodies to HSV-1 and HSV-2 (II/I index) and the content of monotypic antibodies. Production of monotypic antibodies to HSV-1 and HSV-2 was, under these conditions, independent of previous exposure to HSV.

5096 RECEPTORS FOR SHEEP ERYTHROCYTES (E) AND ERYTHROCYTE-ANTIBODY-COMPLEMENT COMPLEXES (EAC) ON THE LYMPHOBLASTS OF CHILDHOOD ACUTE LYMPHOBLASTIC LEUKEMIA.

(Eng.) Nakazawa, S. (Depts. Pediatrics, Immunology, and Immunochemistry Res., Roswell Park Memorial Inst., 666 Elm St., Buffalo, NY 14263); Minowada, J.; Sinks, L. F. *Med Pediatr Oncol* 2(2): 147-155; 1976.

Two cell-surface markers, rosette formation with SRBC (E rosette) as a T cell marker and rosette formation with a bovine RBC-antibody-complement complex (EAC rosette) as a B cell marker were determined on peripheral blood lymphocytes and lymphoblasts from 89 children with acute lymphoblastic leukemia (ALL). In the majority of the patients (12/15 untreated patients and 6/11 patients in relapse), lymphoblasts exhibited neither E nor EAC rosettes. Lymphoblasts from one untreated patient with a mediastinal mass displayed E (50%) and EAC

(15%) rosette formation. In 3 of 11 patients in relapse, lymphoblasts displayed an increase in EAC rosette formation with progressive disease. In the remaining patients with active disease, a small and variable proportion of lymphoblasts expressed E and/or EAC rosette formation. In 63 patients in remission, the percentages of E and/or EAC rosettes were similar to those of control. The results indicate a wide heterogeneity with respect to expression of lymphocyte membrane markers in lymphoblasts and in normal lymphocytes in patients with active ALL. (34 references)

5097 ELECTRON MICROSCOPIC DETECTION OF SURFACE RECEPTORS ON IMMUNOCOMPETENT AND TUMOR CELLS. (Ger.) Fritsch, S. (Zentralinstitut fuer Mikrobiologie und experimentelle Therapie Jena, 69 Jena, Beuthenbergstrasse 11, East Germany); Wollweber, L. *Acta Histochem (Jena) (Suppl)* 15: 241-248; 1975.

The ultracytochemical demonstration of carbohydrate receptors on tumor and immunocompetent cells was studied. The test material consisted of peritoneal macrophages, lymphocytes, and granulocytes from inbred mice and guinea pigs, and ascites cells (L 1210) from HMDF$_1$ hybrid mice. Concanavalin A as a reaction model, the coupling of lectin-peroxidase via glutaraldehyde, the peroxidase-glycoprotein complex, and a quantitative assay of the Con A response were analyzed. (12 references)

5098 SEPARATE FC-RECEPTORS FOR IMMUNOGLOBULINS IgG2a AND IgG2b ON AN ESTABLISHED CELL LINE OF MOUSE MACROPHAGES. (Eng.) Walker, W. S. (St. Jude Children's Res. Hosp., Memphis, TN 38101). *J Immunol* 116(4): 911-914; 1976.

The specificity of Fc receptors on IC-21 cells, which were derived from mouse peritoneal macrophages with antibody-dependent effector cell activity, was examined. Only IgG2a and IgG2b myeloma proteins bound readily to IC-21 Fc receptors, the former in nonaggregated and aggregated form, the latter only as aggregated complexes. IgG2a bound in a manner characteristic of classically defined cytophilic antibody, while IgG2b binding appeared to be mediated by Fc receptors for antigen-antibody complexes. The results support the view that IC-21 macrophages possess separate and distinct Fc receptor sites for these two immunoglobulins.

5099 FUSION BETWEEN IMMUNOGLOBULIN-SECRETING AND NONSECRETING MYELOMA CELL LINES. (Eng.) Kohler, G. (Basel Inst. for Immunology, 487 Grenzacherstrasse, CH-4005 Basel 5, Switzerland); Howe, S. C.; Milstein, C. *Eur J Immunol* 6: 292-295; 1976.

The defects in two nonsecreting variant clones of the mouse plasmacytoma MOPC 21 (P3) were studied by tissue culture methods. The variants (NSI and NSIII) do not synthesize detectable heavy chains. NSI synthesizes, but does not secrete, light chains, and NSIII does not synthesize light chains. A screening procedure based on a hemolytic plaque assay using anti-immunoglobulin-coated RBC was used to detect revertant cells secreting immunoglobulin. No revertants were detected among 2 x 10^7 cells. Both variant lines were fused to another myeloma line (PI), which secretes a complete immunoglobulin and excess light chains. Isoelectric focusing showed that in the hybrids there was no reactivation of the synthesis of nonexpressed chains. The defects leading to loss of synthesis could not therefore be complemented in the hybrid lines. The secretion of a light chain by NSI, on the other hand, could be complemente in the hybrid, but the light chain was only secreted as part of a new immunoglobulin hybrid molecule. (16 references)

5100 QUANTITATION OF CONSTANT AND VARIABLE REGION GENES FOR MOUSE IMMUNOGLOBULIN λ CHAINS. (Eng.) Honjo, T. (Dept. Physiological and Chemistry Nutrition, Faculty Medicine, Univ. Tokyo, Tokyo, Japan); Packman, S.; Swan, D.; Leder, P. *Biochemistry (Washington)* 15(13): 2780-2785; 1976.

cDNA complementary to purified mRNA derived from the λ chain-producing myeloma tumor, RPC-20 was synthesized and characterized. This cDNA is of sufficient length to encode the constant region and a major portion of the variable region sequence of the λ gene. In addition, the expected cross-hybridization range was extended to several different members of the closely related λ subgroup, as well as to a member of the λ subgroup represented by MOPC-315. Since there is a minimum of seven known members of the common λ subgroup in addition to MOPC-315, thes sequences, in accordance with the germ line hypothesis, must be represented by a minimum of eight variable region genes. With the RPC-20 cDNA probe and hybridization kinetic analysis, this sequence was found to be represented as approximately two copies per haploid genome in DNA derived from a variety of k- and λ-producing tumors and normal tissue. The findings tend to rule out separate germ line genes corresponding to each individual λ light chain variant. Although reasonable, this assumption is considered tentative; the λ system in mice may represent some kind of special case in which much o the λ diversity has been deleted. (30 references)

5101 THE MONOCLONAL NATURE OF LYMPHATIC LEUKEMIA. (Eng.) Seligmann, M. (Univ. Paris VII, Hopital Saint-Louis Paris, France); Preud'Homm J. L.; Brouet, J. C. *Birth Defects* 11(1): 163-170; 1975.

The surface immunoglobulins (Ig) of B lymphocytes from patients with chronic lymphatic leukemia (CLL) were studied to determine if they are monoclonal i nature. By direct immunofluorescence, it was found that more than 70% of the circulating blood lymphocytes in 60 of 65 CLL cases bore Ig molecules on their surface. The distribution of heavy and light chains reflected the distribution of surface Ig on normal lymphocytes; IgM was the predominant class. The study of surface Ig synthesized in vitro is briefly outlined. An apparent polyclonal staining can result from the simple staining of freshly dra cells. This may be caused by anti-IgG antibody activity of a monoclonal surface IgM, by the attachment of immune complexes at the lymphocyte surface, or by the binding of serum antibodies to cell membrane determinants. A biclonal proliferation, characterized by distinct surface Ig markers, was demonstrated in four cases of CLL. Monoclonal surface Ig were also detected on the lymphoblasts in two cases of acute transformation of CLL, in several patients with acute lymphatic lymphosarcoma cell leukemia, and in one case of acute lymphatic leukemia. It is concluded that CLL usually represents a monoclonal B-lymphocyte proliferation with a block in the maturation process. The detection of membrane-bound Ig is of great value in the early diagnosis of CLL. (33 references)

5102 HETEROGENEITY OF IMMUNOLOGIC MARKERS AND SURFACE MORPHOLOGY IN CHILDHOOD LYMPHOBLASTIC LYMPHOMA. (Eng.) Jaffe, E. S. (Building 10, Room N110, NIH, Bethesda, MD 20014); Braylan, R. C.; Frank, M. M.; Green, I.; Berard, C. W. *Blood* 48(2): 13-222; 1976.

The neoplastic cells from seven patients (12-23 yr of age) with childhood lymphoblastic lymphoma were studied for cell surface markers and surface morphology in the scanning electron microscope (SEM). The cells were studied for surface immunoglobulin (SIg), complement receptors (EAC), receptors for cytophilic antibody (IgGEA), and nonimmune rosette formation with sheep RBC (E). In one patient the cells exclusively bound E, suggesting a T lymphocytic origin. In two patients the cells bound EAC, but demonstrated no other B lymphocytic markers. In two patients no markers were detected, and in two patients receptors for both E and EAC were demonstrated. In one patient both markers were demonstrated simultaneously on the same neoplastic cells. The neoplastic cells were also examined by SEM after fixation and critical point dehydration. In four patients the cells were predominately smooth, whereas in two patients variable numbers of surface microvilli were present. The surface features could not be correlated with membrane markers. A comparison of the surface markers with clinical and cytologic features revealed clinical homogeneity in spite of the heterogeneous immunologic markers. This heterogeneity was most likely a reflection of neoplastic alteration and disordered differentiation of the cells. Complement receptors on the cells have not been previously reported in this disease. (39 references)

5103 DEMONSTRATION OF THE INHIBITORY EFFECT OF HUMAN ALPHA-FETOPROTEIN ON IN VITRO TRANSFORMATION OF HUMAN LYMPHOCYTES. (Eng.) (Dept. Medicine, Univ. Chicago, Chicago, IL 60637). *Proc Natl Acad Sci USA* 73(8): 2857-2861; 1976.

The effects of human α-fetoprotein (HAFP), isolated from the serum and ascitic fluid of a hepatoma-bearing patient, on the in vitro transformation of human peripheral blood lymphocytes by a variety of mitogenic stimuli were studied. At 2.5 mg/ml, HAFP inhibited the lymphocyte response of phytohemagglutinin, concanavalin A, and rabbit anti-human thymocyte serum, but failed to inhibit the response to pokeweed mitogen. HAFP inhibited the one-way mixed lymphocyte culture at concentrations of 250-500 μg/ml, but not at 100 μg/ml. Exposure of the lymphocytes to 2.2 mg/ml of HAFP for 18 hr did not result in significant lymphocytotoxicity, and such cells washed free of HAFP were fully capable of participating in the mixed lymphocyte culture. HAFP did not inhibit lymphocyte erythrocyte (E)-rosette formation. Fetal HAFP was more effective in inhibiting human lymphocyte responses than hepatoma HAFP. The results suggest that HAFP plays an important immunoregulatory role during fetal development, possibly through the suppression of thymus-derived lymphocyte responses to antigenic stimuli, and that there are important differences in the biological properties of hepatoma and fetal HAFP. (31 references)

5104 INVESTIGATIONS OF THE T AND B CELLS AND THE HEMOPEXIN-CARRYING LYMPHOCYTES IN CASES OF PORPHYRIA CUTANEA TARDA. (Ger.) Simon, N. (Clinica Dermato-Venerologica, Koranyi Fasor 8-10, Pf. 480, Szeged, Hungary); Husz, S.; Dobozy, A.; Hunyadi, J. *Arch Dermatol Forsch* 255(2): 149-156; 1976.

The levels of T and B lymphocytes and the ratio of hemopexin-carrying lymphocytes were determined in 1 woman and 13 men with symptomatic porphyria cutanea tarda (PCT). The patients were 44-70 yr old; they were compared to 15 control subjects, who were 20-60 yr old and without evidence of liver disease. The amount of the PCT IgD fraction was insignificantly lower, and that of IgM and IgE insignificantly higher, than control values. The amount of PCT IgG and IgA was higher than control values at $p < 0.01$ and $p < 0.1$, respectively. The significant elevation in IgG is linked to a 6% increase in PCT B cells. The level of T lymphocytes was 2% higher in control subjects ($p < 0.5$). Hemopexin-carrying lymphocytes in the PCT group were increased about 4% over controls ($p < 0.01$); the values for more than half the patients were above the highest normal limit. There was no significant difference between the two groups in T lymphocyte rosette formation with SRBC, thymidine incorporation in phytohemagglutinin-stimulated lymphocyte cultures, or in tuberculin-induced inhibition of leukocyte migration. One PCT woman presenting with malignant hepatoma had greatly increased immunoglobulins (more than double the PCT values) and reduced T lymphocytes (14% below the PCT level). (21 references)

5105 SELECTIVE EFFECT ON T AND B CELL SUBPOPULATIONS IN RAT LYMPHOID ORGANS AFTER URETHAN TREATMENT. (Eng.) Franceschi, C. (Istituto di Patologia Generale, Istituto di Cancerologia e Clinica Pediatrica, Universita di Bologna, Bologna, Italy); Perocco, P.; Paolucci, P.; Prodi, G. *Int Arch Allergy Appl Immunol* 50(5): 513-524; 1976.

The selective effect exerted by urethan (UR) on different lymphocyte subpopulations was investigated. In vitro phytohemagglutinin (PHA) and concanavalin A

(Con A) responsiveness of thymus and bone marrow cells and E (sheep erythrocytes), EA (erythrocytes sensitized with antibody), and EAC (erythrocytes sensitized with antibody and complement) rosette-forming cells of these organs and the spleen were studied in Fischer rats at various times after a carcinogenic treatment with UR (0.5 mg/g body wt). Immediately after treatment, organ cellularities were drastically reduced, with a progressive recovery as time passed. One day after treatment, the thymocyte response to PHA showed a fourfold increase, while organ cellularity dropped to 1%. This response fell below normal values after 7 days with an overshoot after days 14 and 21. UR-treated bone marrow cells showed a response to PHA below normal values after 1 and 7 days, a twofold increase after 3 days, and an overshoot after 14 and 21 days. The responsiveness of both organs to Con A was affected by UR treatment to a much lesser extent, although the pattern was similar to that of PHA. E were not found in normal or UR-treated animals. UR causes a progressive diminution of EAC, but the number of EA remains unaffected, although both are B cells; this indicates either a selective UR effect on two distinct subsets of B cells or a different sensitivity of the same cell line at different stages of differentiation. The overshoot in response to mitogens at day 14 is consistent with the presence after UR treatment of ontologically immature and then immunologically unreactive T cells. (21 references)

5106 CHARACTERIZATION OF A SUBPOPULATION OF HUMAN T LYMPHOCYTES REACTIVE WITH AN HETEROANTISERUM TO HUMAN BRAIN.

(Eng.) Brouet, J.-C. (Hopital Saint-Louis, 75475 Paris Cedex 10, France); Toben, H. *J Immunol* 116(4): 1041-1044; 1976.

Rabbit antiserum to human fetal brain reacted with a subpopulation of normal human T cells. The distribution of reactive T cells varied according to the organ tested: 23% of peripheral blood lymphocytes, 5% of tonsil lymphocytes, and less than 1% of thymocytes were positive. Reactive cells did not transform after phytohemagglutinin or pokeweed stimulation but were at least weakly stimulated by allogeneic cells. T-derived neoplastic cells from one case of T acute lymphoblastic leukemia, two patients with Sezary's syndrome, and from three out of five cases of T chronic lymphocytic leukemias (CLL) yielded negative results. In contrast, all the leukemic cells from two other patients with T-derived CLL were positive. T cell proliferations may be homogenous.

5107 B AND T LYMPHOCYTE RESPONSES IN MAREK'S DISEASE.

(Eng.) Payne, L. N. (Houghton Poultry Res. Station, Houghton, Huntingdon, Cambridgeshire PE17 2DA, England); Rennie, M. *Bibl Haematol* (43): 351-353; 1976.

B and T cell involvement in different tissues in Marek's disease (MD) was investigated in Rhode Island Red chicks and in Brown Leghorns. Gonadal lymphomas were previously found to be composed of 17% B cells and 75% T cells. Five tumors arising in the kidney, heart, or proventriculus in the new series of chicks consisted of 72% T cells and 19% B cells, indicating that nongonadal lymphomas are similar to those arising in the gonads. The proportions of B and T cells in the bursa, thymus, and spleen in eight MD affected birds and eight control birds at 35-52 days after infection were as follows: bursa, 28% T cells and 71% B cells for MD birds compared with 1% and 98%, respectively, in the controls; thymus, 84% T cells and 9% B cells for MD birds compared with 98% and 2%, respectively, in the controls; and spleen, 67% T cells and 30% B cells for MD birds compared with 59% and 37% in the controls. In the peripheral blood, B and T cells and lymphocytes were increased at 9 days after infection; at 14, 21, and 35 days B cells decreased whereas T cells and lymphocytes increased. It is concluded that MD is essentially a T cell neoplasm. The roles of nontransformed B and T cells in the development of the lymphoproliferative lesions are still obscure. (14 references)

5108 RESTORATION OF IMMUNOCOMPETENCE IN LEUKEMIA VIRUS-INFECTED SPLENOCYTES IN VITRO BY PERITONEAL EXUDATE MACROPHAGES.

(Eng.) Spector, S.; Bendinelli, M.; Patel, N.; Friedman, H. *In: Tumor Virus Infections and Immunity.* Crowell, R. L.; Friedman, H.; Prier, J. E., eds. (Baltimore: Univ. Park Press): pp. 215-221; 1976.

The restoration of immunocompetence was studied in splenocytes from BALB/c mice infected with Rowson-Parr virus (RPV) or Friend leukemia virus (FLV) by peritoneal exudate macrophages. Splenocytes were removed from the animals at various times after iv infection with virus, cultured for 5 days with sheep SRBC, and plated for plaque-forming cells. The peak of immunosuppression after RPV infection was observed at 5 days, while the immunosuppression following FLV was progressive. The addition of 10^5-10^6 peritoneal exudate cells (PEC) to splenocytes cultured 5 days after RPV infection completely restored immunocompetence. Treatment of the PEC with antiserum and complement did not alter the restorative power, indicating that macrophages were responsible. However, the addition of adherent cells from spleen cell preparations did not result in restoration of immunocompetence, suggesting that perhaps activated macrophages, such as those in the PEC preparations, were required. Similar results were observed with splenocytes from FLV-infected mice. The addition of bone marrow-derived cells, thymus-derived cells, whole spleen cells from normal mice, or ''educated'' T cells did not restore immunity to RPV-suppressed cells, further suggesting that the responsible cells in the PEC preparations were macrophages. Although the precise mechanism is unknown, improved antigen focusing or processing may be involved. (12 references)

5109 INTERFERON PRODUCTION BY HUMAN LEUKAEMIC LEUCOCYTES.

(Eng.) Hadhazy, G. (Inst. Microbiology, Univ. Medical Sch., H-4012 Debrecen, P.O.B. 17, Hungary); Fekete, B.; Szabo, G.; Szabo, B. *Acta Microbiol Acad Sci Hung* 23(1): 15-22; 1976.

Sendai virus-induced interferon (IF) production by partially purified human leukocyte suspensions of normal donors and of leukemic patients was investigated in vitro. Increased IF production was observed with leukocytes from patients with chronic myelogenous-leukemia (CML) during exacerbation, but the production was approximately normal with cells taken during remission. Production was not influenced by large doses of cytostatics (dibromomannitol, 5-fluorouracil, 5-fluoro-2'-deoxyuridine, 5-hydroxyurea, 6-mercaptopurine, and cyclophosphamide) irrespective of whether normal or CML leukocytes were used. In contrast, production was inhibited in both systems by inhibitors of RNA or protein synthesis (actinomycin D, puromycin, and cycloheximide). CML leukocytes produced IF for a prolonged period of time compared with normal leukocytes. Leukocytes from children with acute blastic leukemia and those from adults with chronic lymphoid or acute paramyeloblastic leukemia produced, in contrast to normal leukocytes, approximately as much IF in the absence as in the presence of serum. It is concluded that Sendai virus-induced IF synthesis in CML leukocytes requires de novo protein synthesis. (52 references)

5110 THE EFFECT OF IMMUNODEPRESSORS ON A TRANSPLANTED OVARIAN TUMOR IN RATS. (Rus.) Vasil'eva, G. S. (Kazakh Res. Inst. Oncology and Radiology, Alma-Ata, USSR). *Vopr Onkol* 22(1): 73-75; 1976.

Male and female rats received either hydrocortisone (HC) or 150 R 3 days prior to ip peritoneal transplantation of 0.5 ml ovarian ascites. Groups of animals were sacrificed every 24 hr and the ascites development was assayed. Exponential ascites growth continued to posttreatment day 4, with a tripling of the mitotic index, in HC animals, in contrast to day 6 for controls. HC did not affect the growth rate. After whole-body irradiation there were two exponential phases, at days 5 and 8; there was only one control peak, at day 6. The rate of tumor growth was increased in the first phase and decreased in the second phase, as measured by the mitotic index. In irradiated rats the degree of metachromasia was lower up to day 4, but increased slightly thereafter. Metachromasia fell markedly by day 2 in HC animals and subsequently followed a pattern of alternate increases and decreases up to day 7. The stimulus effect of irradiation was slightly greater than HC.

5111 IMMUNOLOGIC REACTIVITY TO SOLUBLE AUTOCHTHONOUS TUMOR EXTRACTS IN DOGS WITH SPONTANEOUS MALIGNANCIES. (Eng.) Tsoi, M.-S. (Univ. Washington Sch. Medicine, Seattle, WA 98195); Weiden, P. L.; Storb, R. *J Immunol* 116(4): 1134-1139; 1976.

The presence of tumor-associated antigens (TAA) in dogs with spontaneous lymphoma (L) or solid tumors (ST) was investigated by testing of soluble tumor cell extracts for their ability to stimulate autochthonous in vitro lymphocyte blastogenesis and in vivo intradermal delayed hypersensitivity responses. Blastogenic responses to intact, cryopreserved, autochthonous tumor cells were also determined. Fifteen of 26 (58%) L dogs and 23 of 32 (72%) ST dogs had positive blastogenic responses to at least one concentration of autochthonous tumor extracts. Blastogenic responses to tumor extract and to cryopreserved whole tumor cells correlated during simultaneous performed tests. No consistent effect of autochthonous serum on the lymphocyte response to autochthonous tumor extract was observed. Two of 11 L dogs had positive skin tests to autochthonous tumor extract and none reacted to the control extract. Three of 21 ST dogs had positive skin tests and two had a borderline response, while two ST dogs had a positive response to control extract. Five of 7 L and 9 of 18 ST dogs were anergic, as defined by failure to respond to intradermal PPD challenge after sensitization with BCG. Lymphocytes from most dogs with spontaneous tumors underwent blastogenesis in vitro in response to autochthonous soluble tumor extracts. When tested simultaneously, these responses correlated with responses to cryopreserved intact tumor cells. These results are compatible with the presence of TAA in extracts from cells of spontaneous canine tumors. Delayed skin test reactivity was an uncommon and unpredictable finding and is apparently not useful in dog TAA detection.

5112 HYBRIDIZATION OF A HUMAN MYELOMA PERMANENT CELL LINE WITH MOUSE CELLS. (Eng.) Zeuthen, J. (Inst. Human Genetics, Univ. Aarhus, DK-8000 Aarhus C, Denmark); Nilsson, K. *Cell Differ* 4(6): 355-368; 1976.

As evidenced by immunosorbent tests, the hybrid cells derived from the fusion of a permanent human myeloma cell line, (which secretes complete IgE); and a subline of mouse L cells did not secrete IgE. The hybrid cells did not contain intracellular IgE (ε or λ chains) in amounts detectable by fluorescent antibody techniques. The doubling times and cell cycle parameters of the hybrid cells were similar to those of the slow-growing parental human myeloma cells. The growth of the hybrid cells was characterized by a higher degree of contact inhibition than the parent mouse cells.

5113 A NEW MICROCYTOTOXICITY ASSAY FOR IN VITRO DEMONSTRATION OF CELLULAR IMMUNITY IN EXPERIMENTAL GLIOMAS (Meeting Abstract). (Eng.) Hirt, P. (New York Univ. Medical Center, New York, NY); Cravioto, H. *J Neuropathol Exp Neurol* 35(1): 102; 1976.

5114 IMMUNOGENICITY OF OSTEOSARCOMA IN THE RAT, INDUCED BY MURINE SARCOMA VIRUS-MOLONEY (Meeting Abstract). (Eng.) Urovitz, E. P. (Dept. Surgery, Mt. Sinai Hosp., Toronto, Ontario, Canada); Langer, F.; Gross, A. E.; Czitrom, A. A.; Stylianos, S. K. *Can J Surg* 19(4): 333-334; 1976.

5115 MURINE T-CELL LYMPHOMAS, A MODEL SYSTEM FOR MOUSE T CELLS. (Eng.) Krammer, P. H. *In: Leukocyte Membrane Determinants Regulating Immune Reactivity*. Eijsvoogel, V. P.; Roos, D.; Zeijlemaker, W. P., eds. (New York: Academic Press, Inc.): p. 249; 1976.

5116 MICROANGIOGRAPHY IN EXPERIMENTAL LYMPHNODE METASTASIS (Meeting Abstract). (Eng.) Herman, P. C. (Harvard Medical Sch., Boston, MA); Kim, C. H.; Mellins, H. Z. *Invest Radiol* 10(5): 467; 1975.

5117 TUMOR CELL SURVIVAL IN A HOSTILE IMMUNE ENVIRONMENT. (Eng.) Lausch, R. N.; Murasko, D. M.; Hay, K. A. *In: Fundamental Aspects of Metastasis.* Weiss, L., ed. (Amsterdam: North-Holland Publishing Co.): pp. 327-340; 1976.

5118 TUMOR-SPECIFIC IMMUNE RESPONSIVENESS OF THE TUMOR-BEARING HOST. (Eng.) Burk, M. W. (Dept. Surgery, Univ. Minnesota, Minneapolis, MN); Yu, S.; McKhann, C. F. *Israel J Med Sci* 12(4/5): 360-363; 1976.

5119 INFLUENCE OF BURSA-DEPENDENT IMMUNITY ON HOST DEFENCE AGAINST TUMORS (Meeting Abstract). (Eng.) Linna, T. J. (Dept. Microbiology Immunology, Temple Univ. Sch. Medicine, Philadelphia, PA); Lam, K.M.; Hu, C. *Scand J Immunol* 5(4): 448; 1976.

5120 THE CELLULAR BASIS OF IMMUNITY AGAINST YOSHIDA ASCITES SARCOMA IN T CELL DEFICIENT MICE. (Eng.) Allegretti, N. (Dept. Physiology, Univ. Zagreb, Faculty Medicine, Croatia, Yugoslavia); Marusic, M.; Culo, F. *Transplantation* 22(1): 69-71; 1976.

5121 CELL-MEDIATED IMMUNITY IN ACUTE INFECTIOUS MONONUCLEOSIS. (Eng.) Royston, I. (Div. Oncology, Dept. Medicine, Stanford Univ. Medical Center, Stanford, CA 94305); Sullivan, J. L.; Periman, P. O.; Perlin, E. *Bibl Haematol (Basel)* (43): 278-280; 1976.

5122 SURFACE PHENOTYPE OF NONADHERENT PERITONEAL CELLS EFFECTING CELL-MEDIATED CYTOTOXICITY IN VITRO FOR ALLOGENEIC AND SYNGENEIC MURINE SARCOMA CELLS. (Eng.) Shiku, H. (Memorial Sloan-Kettering Cancer Center, New York, NY); Takahashi, T.; Bean, M. A.; Hammerling, U.; Oettgen, H. F.; Old, L. J. *Israel J Med Sci* 12(4/5): 425-434; 1976.

5123 CELLULAR INHIBITION OF LYMPHOID CELL CYTOTOXICITY AGAINST SYNGENEIC TUMORS (Meeting Abstract). (Eng.) Firket, H. (Laboratoire d'Anatomie Pathologique, Universite de Liege, B4020 Liege, Belgium); Lafontaine, N. *J Cell Biol* 70(2/Part 2): 317a; 1976.

5124 DEFECTIVE LYMPHOCYTE-MEDIATED SPONTANEOUS CYTOTOXICITY OF HUMAN TUMOR TARGET CELLS BY CHRONIC LYMPHOCYTIC LEUKEMIC LYMPHOCYTES (Meeting Abstract). (Eng.) Kaplan, M. E. (Minneapolis Veterans Admin. Hosp., Minneapolis, MN); Gormus, B. J.; Lange, P.; Hakala, T. *Clin Res* 24(4): 571A; 1976.

5125 HUMAN T- AND NON-T LYMPHOCYTOTOXICITY: COLON CARCINOMA (Meeting Abstract). (Eng.) Gannon, P. (Dept. Surgery, Roswell Park Memorial Inst., Buffalo, NY); Holyoke, E. D.; Goldrosen, M. H. *Clin Res* 23(5): 595A; 1975.

5126 THE ABSENCE OF B-CELL ANTIGEN B2 FROM LEUKEMIA CELLS AND LYMPHOBLASTOID CELL LINES. (Eng.) Billing, R. J. (Dept. Surgery, Sch. Medicine, Univ. California, Los Angeles, CA 90024); Terasaki, P. I.; Honig, R.; Peterson, P. *Lancet* 1(7974): 1365-1367; 1976.

5127 ANTIGENIC DETERMINANTS IN HUMAN LEUKEMIC LEUKOCYTES (Meeting Abstract). (Eng.) Pisciotta, A. V. (Dept. Medicine, Medical Coll. Wisconsin, Milwaukee, WI); Wilson, B. R. *Clin Res* 24(3): 481A; 1976.

5128 LEUKOCYTE MIGRATION INHIBITION BY LEUKEMIA ASSOCIATED ANTIGEN IN CHILDREN WITH ACUTE LEUKEMIA AND THEIR FAMILY MEMBERS (Meeting Abstract). (Eng.) Hann, H. L. (Inst. Cancer Res., Fox Chase Cancer Center, Philadelphia, PA); Wrigley, D.; Evans A. E. *Clin Res* 24(4): 549A; 1976.

5129 MOLECULAR ASSOCIATION OF HISTOCOMPATIBILIT AND TUMOUR ANTIGENS ON THE MEMBRANE OF MALIGNANT TUMOUR CELLS FROM CHILDREN (Meeting Abstract). (Eng.) O'Keefe, D. E. (Royal Children's Hosp. Res. Foundation, Melbourne, Victoria, Australia); Wilson, F. C.; Jose, D. G. *Clin Exp Pharmacol Physiol* 3(3): 276-277; 1976.

5130 IMMUNOFERRITIN STUDIES ON SURFACE ANTIGENS OF CELLS INFECTED WITH MOUSE LEUKEMIA VIRUS (Meeting Abstract). (Eng.) Kodama, T. (Cancer Inst., Hokkaido Univ. Sch. Medicine, Sapporo, Japan) *J Electron Microsc (Tokyo)* 25(1): 58-59; 1976.

5131 SEQUENTIAL ADSORPTION ANALYSIS OF ANTIBODIES TO NEUROECTODERMAL CELLS BY AN INDIRECT QUANTITATIVE METHOD. (Eng.) Harwood, S. E. (Box 3045, Duke Univ. Medical Center, Durham, NC 27710); Bigner, D. D.; Wechsler, W.; Day, E. D. *J Natl Cancer Inst* 56(6): 1201-1205; 1976.

5132 STIMULATION OF PHOSPHATE INCORPORATION INTO PHOSPHOLIPIDS IN TUMOR CELLS TREATED WITH ENHANCING ANTIBODY (Meeting Abstract). (Eng.) Shearer, W. T. (Dept. Pediatrics, Washington Univ. Sch. Medicine, St. Louis, MO 63130). *Clin Res* 24(4) 549A; 1976.

5133 INHIBITION OF ANTIBODY-COMPLEMENT MEDIATE KILLING OF TUMOR CELLS BY HORMONES (Meeting Abstract). (Eng.) Schlager, S. I. (NCI, NIH, Bethesda, MD 20014); Ohanian, S. H.; Borsos, T. *J Cell Biol* 70(2/Part 2): 237a; 1976.

5134 STAGE-RELATED CHANGES IN MEMBRANE FLUORESCENT ANTIBODY RESPONSE TO MELANOMA CELLS (Meeting Abstract). (Eng.) Dent, P. B. (McMaster Univ. and Ontario Cancer Treatment Res. Foundation, Hamilton, Ontario, Canada); Liao, S. K.; McCulloch, P. B.; Blajchman, M. A.; MacNamara, J. *Clin Res* 23(5): 643A; 1975.

5135 ROLE OF COMPLEMENT IN ANTIBODY-STIMULATED CALCIUM UPTAKE BY TUMOR CELLS (Meeting Abstract). (Eng.) Shearer, W. T. (Depts. Pediatrics and Medicine, Washington Univ. Sch. Medicine, St. Louis, MO 63130); Atkinson, J. P. *J Immunol* 116(6): 1749-1750; 1976.

5136 STIMULATION OR INHIBITION OF TUMOR GROWTH IN NUDE MICE BY ALTERATION OF SERUM ANTITUMOR ANTIBODY AND COMPLEMENT LEVELS (Meeting Abstract). (Eng.) Shearer, W. T. (Dept. Pediatrics, Washington Univ. Sch. Medicine, St. Louis, MO 63130); Shearer, C. M.; Atkinson, J. P. *Clin Res* 24(4): 549; 1976.

5137 STRONG EXPRESSION OF FC-RECEPTORS ON LEUKEMIC CELLS IN HAIRY CELL LEUKEMIA. (Eng.) Rieber, E. P. (Abteilung fuer Experimentelle Chirurgie und Immunologie, Chirurgische Universitaetsklinik, Tuebingen, West Germany); Saal, J. G.; Riethmueller, G.; v. Heyden, H. W.; Waller, H. D. *Z Immunitaetsforsch* 151(3): 282-288; 1976.

5138 NATURAL ANTIBODIES IN SERA FROM HEALTHY HUMANS TO ANTIGENS ON SURFACES OF TYPE C RNA VIRUSES AND CELLS FROM PRIMATES. (Eng.) Aoki, T. (Immunology Section, Lab. Viral Carcinogenesis, NCI, Bethesda, MD 20014); Walling, M. J.; Bushar, G. S.; Liu, M.; Hsu, K. C. *Proc Natl Acad Sci USA* 73(7): 2491-2495; 1976.

5139 INHIBITION OF E-ROSETTE FORMATION BY SERA FROM CANCER PATIENTS (Meeting Abstract). (Eng.) Whitehead, R. H. (Univ. Dept. Surgery, Welsh Natl. Sch. Medicine, Cardiff, Wales); Roberts, G. P.; Thatcher, J.; Teasdale, C.; Hughes, L. E. *Br J Cancer* 34(3): 319; 1976.

5140 LEUKEMIA-ASSOCIATED ANTIGENS DETECTED BY HETEROLOGOUS ANTISERA. (Eng.) Durantez, A. (Dept. Microbiology and Immunology, Human Immunobiology Group, Univ. California Sch. Medicine, Los Angeles, CA 90024); Zighelboim, J.; Gale, R. P. *J Natl Cancer Inst* 56(6): 1217-1219; 1976.

5141 IDENTIFICATION OF SERUM 'BLOCKING' FACTOR(S) IN PROSTATIC AND RENAL CELL CARCINOMA BY THE LEUKOCYTE ADHERENCE INHIBITION TEST (Meeting Abstract). (Eng.) Bhatti, R. (Cook County Hosp., Chicago, IL); Bruns, G. R.; Rios, E.; Guinan, P. D.; Ablin, R. J. *Clin Res* 23(5): 583A; 1975.

5142 CLq BINDING SUBSTANCES IN CANCER AND COMPLEMENT DEFICIENT SERA (Meeting Abstract). (Eng.) Teshima, H. (Sloan-Kettering Inst., New York, NY); Kundel, H. G.; NoorbibiDay, K. *J Immunol* 116(6): 1752; 1976.

5143 ROLE OF COMPLEMENT IN ENHANCED TUMOR GROWTH IN NUDE MICE (Meeting Abstract). (Eng.) Shearer, W. T. (Depts. Pediatrics and Medicine, Washington Univ. Sch. Medicine, St. Louis, MO 63130); Atkinson, J. P. *J Immunol* 116(6): 1749; 1976.

5144 STUDIES WITH IMMUNOGLOBULIN mRNA FROM MOUSE MYELOMAS (Meeting Abstract). (Eng.) Faust, C. H. (Dept. Surgery, Biochemistry, Microbiology and Immunology, Univ. Oregon Health Sciences Center, Portland, OR 97201); Heim, I. *J Cell Biol* 70(2/Part 2): 374a; 1976.

5145 IMMUNOGLOBULIN RECEPTORS IN LEUCOCYTES FROM PATIENTS WITH ACUTE MYELOID LEUKAEMIA (Meeting Abstract). (Eng.) Taylor, G. M. (Dept. Medical Genetics, St. Mary's Hosp., Manchester, England); Ridway, J. C.; Harris, R.; Freeman, C. B. *Br J Cancer* 34(3): 318; 1976.

See also:

* (Rev): 4826, 4828, 4829, 4830, 4831, 4832, 4833, 4834, 4835, 4869, 4870, 4872, 4875
* (Chem): 4916
* (Phys): 4964, 4975, 4980, 4984
* (Viral): 4997, 5002, 5005, 5015, 5016, 5019, 5025, 5031, 5043, 5046, 5062, 5063, 5079, 5091
* (Path): 5150, 5151, 5210, 5223, 5235, 5255
* (Epid-Biom): 5299, 5300, 5305

5146 CYTOGENETIC STUDIES AFTER CONTACT WITH ACUTE CHILDHOOD LEUKEMIA. (Ger.) Kirchner, M. (Universitaets-Kinderklinik, DDR-69 Jena, Kochstrasse 2, East Germany); Franck, A.; Appenroth, D. *Folia Haematol (Leipz)* 103(1): 37-42; 1976.

The karyotypes of peripheral lymphocytes from 21 persons between 20 and 40 yr of age who had occupational exposures of 3-96 mo to childhood leukemias are described. Two control samples were used, one with a negative history of familial malignancy and one with a positive history but only transient exposure. Neither the experimental nor control groups had contact with cytostatic drugs or radiation, except diagnostically. No structural aberrations were found in the chromosomes of any group. The mitotic index ranged between 4.05% and 5.73% and the proliferation rate averaged 62% for each group. Aneuploid metaphases in cell groups 20-45 and those higher than 46 occurred in all persons. Nine of 21 in the experimental group averaged 4.57%, 6/16 controls with familial malignancy averaged 1.2%, and 10/20 controls without familial malignancy averaged 1.24% metaphases in chromosome group 20-26; the difference between experimental and control groups was significant ($p = 0.05$). In the experimental group, 7/9 subjects, most of whom reported 5-8 yr contact with leukemic blood or marrow specimens, had a total of 18 metaphases with 23 chromosomes per plate. There were 19/21 experimental subjects, 14/16 controls with positive family history, and 10/20 controls with negative history with cells containing 27-40 chromosomes; the difference is significant at $p = 0.05$. No significance could be established between the two control groups. Since cells from each group were subjected to the same preparation and incubation, the data are thought to confirm the higher probability of hypoploidy in adults after protracted contact with childhood leukemia cells. (20 references)

5147 TONSILLECTOMY AND LEUKEMIA IN CHILDHOOD. (Ger.) Matzker, J. (HNO-Klinik der Stadt. Krankenanstalten, 5 Koeln 80, Neufelder Strasse 32, West Germany); Klasen, H.-P. *Laryngol Rhinol Otol (Stuttg)* 54(12): 991-997; 1975.

A 10-yr retrospective study of the relation between inflammation of the tonsils and Waldeyer's ring and the onset of leukemia in 159 boys and 146 girls 2-14 yr of age is presented. Nearly 50% of the cases were 2-5 yr old. Only eight tonsillectomies, performed at least 8 wk before the diagnosis of leukemia, were recorded for the 305 leukemic children. There were 3 in 89 cases of lymphoblastic leukemia, 2 in 85 paraleukoblastic leukemias, and 1 each in 64 acute lymphocytic, 15 granulocytic, and 37 acute leukemias. The eight tonsillectomies were compared with a control group of 305 children identical in sex, age, birthplace, and hospital site under treatment for illnesses unrelated to hemopoietic or lymph tissue. There were 40 instances of adenoidectomy of tonsillectomy in the control group. The 5:1 ratio in tonsillectomies corresponds to a difference of 10.5% favoring the nonleukemic population. It is even suggested that the eight tonsillectomized leukemic children might have been victims of incomplete surgical ablation of infected lymph tissue. (22 references)

5148 ACUTE LEUKEMIA IN BURKITT LYMPHOMA. (Eng.
Heideman, R. L. (Depts. Pediatrics and
Pathology, Baylor Coll. Medicine, 6621 Fannin St.,
Houston, TX 77030); Falletta, J. M.; Steuber, C. P.
Starling, K. A.; Rosenberg, H. S.; Fernbach, D. J.
Med Pediatr Oncol 2(2): 215-222; 1976.

The clinical course and findings of a 14-yr-old
girl with Burkitt's lymphoma who presented with
acute leukemia, splenomegaly and an abdominal mass
are described. She responded initially to prednison
alone and later achieved full remission with combin
tion chemotherapy. Established morphologic criteria
and the clinical course were consistent with the
diagnosis of Burkitt's lymphoma, although B cell
determinants were not present on her tumor cells.
(29 references)

5149 IMMUNOBLASTIC LYMPHADENOPATHY WITH PSEUDO
LEUKEMIC BLOOD PICTURE. (Ger.) Schoengen,
A. (Zentrum fuer Innere Medizin und Kinderheilkund
Universitaet Ulm, 79 Ulm/Donau, Steinhoevelstrasse
West Germany); Dietrich, M.; Kubanek, B.; Haferkam
O.; Heimpel, H. *Blut* 32(1): 29-36; 1976.

A 51-yr-old woman with chronic asthmoid bronchitis
developed nodular growths on the skin that healed
depigmented cicatrices. Two years later, the patie
presented with swollen lymph nodes, fever, and hep
splenomegaly. Remission was followed several years
later with leukocytosis (50,000/cu mm), progressiv
thrombopenia, dyspnea, cyanosis, heavy sweating,
fever, palpable liver and spleen, painful lymph
nodes, and hemorrhagic exanthema. Granulocytes wer
shifted left (to promyelocytes), with eosinophilia
and atypical lymphocytes representing transformed
lymphoblasts and transitional forms up to plasma
cells. Immunohistochemical assay eventually confir
a clinical picture of immunoblastic lymphadenopath
(10 references)

5150 ACQUIRED DEFICIENCY OF C_1-ESTERASE INHI
IN LYMPHOID SYNDROMES. (Fre.) Oberling,
(Service des Maladies du Sang, CHU, F 67085, Stras
bourg Cedex, France); Hauptmann, G.; Lang, J. M.;
Bergerat, J. P.; Mayer, G.; Batzenschlager, A.;
Hammann, B.; Gillet, B. *Nouv Presse Med* 4(38): 27
2708; 1975.

The case histories of two patients suffering from
lymphoid syndrome and IgM 7S dysglobulinemia are
reported. Upon examination, complement abnormalit
were linked to a deficiency in C_1-esterase (C_1 IN
The absence of a family history of angioneurotic
edema and a marked fall in the C_1 fraction levels
suggested that the deficiency was acquired and no
congenital. It is believed that the IgM 7S immuno-
globulins in the serum of both patients were resp
sible for the complement system abnormalities. Th
mechanisms by which IgM 7S immunoglobulins produc

the lowering of the C_1 INH levels is not known. The acquired deficiency of C_1 INH is a rare occurrence, with only a few cases reported in the literature, two of which occurred in patients with lymphosarcoma.

5151 AN IMMUNOLOGICAL STUDY OF FOLLICULAR LYMPHOMA, RETICULUM CELL SARCOMA AND HODGKIN'S DISEASE.

(Eng.) Taylor, C. R. (Dept. Pathology, Gibson Labs., Radcliff Infirmary, Oxford OX2 6HE, England). *Eur J Cancer* 12(1): 61-75; 1976.

Immunoperoxidase techniques were used to study intracellular immunoglobulin and muraminidase (lysozyme) in formalin paraffin sections of more than 150 lymph node biopsies. The diseases represented by these biopsies included lymphadenopathies, follicular lymphoma, reticulum cell sarcoma, and Hodgkin's disease. Immunoglobulin components were demonstrated in the neoplastic cells of follicular lymphoma biopsies and in the malignant reticulum cells from some cases of reticulum cell sarcoma and Hodgkin's disease. It was suggested that the immunoglobulins were produced by the cells that contained them. A scheme that links the various types of lymphoreticular neoplasms to the different morphological forms of the B lymphocytes during their cell cycles was proposed. (59 references)

5152 MALIGNANT AND BENIGN LYMPHOMAS OF THE EYE, EYELID AND ORBIT.

(Ger.) Schwarze, E.-W. (Abteilung Allgemeine Pathologie und pathologische Anatomie, Universitaet Kiel, Hospitalstrasse 42, D-2300 Kiel 1, West Germany); Radaszkiewicz, T.; Puelhorn, G.; Goos, M.; Lennert, K. *Virchows Arch [Pathol Anat]* 370(1): 85-96; 1976.

The differential diagnosis of benign and malignant lymphomas of the eye, eyelid, and orbit in 22 biopsies is discussed. None involved Hodgkin's disease. Immunocytoma was diagnosed in 10 cases, including 3 men and 7 women; all but 1 were 50 yr of age or older. Two of the lymphomas were conjunctival, two bulbar, two eyelid, two unknown, and four were retrobulbar. Lymphoplasmacytoma was the dominant immunocytoma; one plasmacytic and one polymorphological type also occurred. Lymphoplasmacytoma is composed chiefly of mature B lymphocytes in diffuse organization surrounding plasmacytic and mast cells. There is no follicular or alveolar fibrous structure or necrosis. The lymphocytes have a strongly basophilic cytoplasm, eccentric nuclei, and no nucleoli. One lymphoma, characterized by a dense proliferation of medium-sized lymphatic cells, basophilic cytoplasm, and basophilic nuclear inclusions, resembled an accumulation of centroblasts. There were 11 benign lymphomas in 3 men and 8 women, all of whom were 40 yr or older. Seven of these lymphomas were localized in the conjunctiva, one was on the eyelid, and three were retrobulbar. One was a Castleman tumor. Only the centroblastic lymphoma was massive; the immunocytomas were of low malignancy. (38 references)

5153 INFANTILE HEMANGIOMA OF THE EYELID: REPORT OF A CASE.

(Eng.) Sebata, K. (Ehime Univ. Sch. Medicine, Matsuyama, Japan); Fujiwara, T.; Kondo, M.; Oishi, S.; Neki, M. *Bull Yamaguchi Med Sch* 22(2): 219-225; 1976.

An infantile hemangioma in a 3-mo-old female is described that occurred in the subcutaneous tissue of the right upper eyelid; small daughter nests were scattered in the surrounding connective tissue. Massive bleeding occurred during surgery. The gross appearance was that of a capillary hemangioma, but the cytoplasm of proliferating cells was plump and swollen instead of flattened. The tumor cells were generally arranged in solid sheets, with relatively few blood vessels of capillary size. Silver impregnation findings showed that the tumor cells were derived from the endothelial cell.

5154 A NEOPLASTIC VARIANT OF ACUTE ERYTHROBLASTOSIS-PROERYTHROBLASTOMA.

(Pol.) Lawkowicz, W. (Instytutu Hematologii, ul. Chocimska 4, 00-957 Warsaw, Poland); Krzeminska-Lawkowiczowa, I.; Knap, J. *Acta Haematol Pol* 7(1): 65-75; 1976.

Uncontrolled proliferation of early precursors of RBC limited to the bone marrow (proerythroblastoma) was seen in two cases of normochromic anemia refractory to treatment, with granulocytopenia and thrombocytopenia without significant enlargement of the abdominal viscera. The cases were observed over a 25-yr period. The bone marrow showed features of advanced anaplasia corresponding to neoplastic cells; there was no evidence of peripheral dissemination. Bone marrow cells revealed a prominent positive PAS reaction, the presence of significant glycogen incrustations, a negative peroxidase reaction in atypical matrix cells, and significantly increased alkaline phosphatase activity in some granulocytes of peripheral blood. Achlorhydria was seen in one case. Some anaplastic paraerythroblasts were obtained in the peripheral blood of both patients toward the end of life, with osteolytic skeletal changes attesting to the progression of the disease. Case 2, representing a probable generalization of neoplastic growth, was diagnosed initially as erythroleukemia because of the appearance of 1%-5% of cells approximating paramyeloblasts in the peripheral blood in the late stages. (29 references)

5155 MORPHOLOGICAL PHASE-CONTRAST CINEMATOGRAPHIC STUDIES OF THE BEHAVIOR OF BONE MARROW CELLS IN VITRO.

(Ger.) Boll, I. (Staedt. Krankenhaus Berlin-Neukoelln, Rudower Strasse 56, D-1000 Berlin 47, West Germany). *Blut* 32(2): 115-130; 1976.

The maturation and concomitant properties of myeloblasts and monoblasts were examined by phase-contrast cinematography. Size, shape, intracellular organization, mitotic indices, kinetics, and stem cell dynamics were contrasted in leukemic and nonleukemic cells. Myeloblasts (My), monoblasts (Mo), and lymphocytes (Lp) have the same nuclear: cytoplasmic ratio of 0.7. My and Mo also have similar internal morphologies, but Mo is double the size of My and might be half as mobile. My differs from Lp in morphology, kinetics, and higher mitotic rate, but both migrate freely between bone marrow and blood. Transformation of My into promyelocytes was confirmed; the promyelocyte and myelocyte have nuclear:cytoplasmic ratios of 0.3 and both are the only stem cells of the granulocytic series occurring in the marrow. Mo transformation to promonocyte, monocyte, and histiocyte was also confirmed. However, Mo can also develop into a granulated cell twice its size, but with the same nuclear:cytoplasmic ratio. This could be considered a mast cell or tissue macrophage; it is basophilic, with large nucleoli, a rough chromatin structure, conspicuous lysosomes, a high mitotic index, and α-naphthylesterase activity. Before the cell hypertrophies, it can enter the granulocytic series; as it grows, it can enter the agranulocytic (monocytic) series; and after it matures, it can enter the erythropoietic line. The lymphopoietic series is unrelated to this stem cell. (68 references)

5156 FLUORESCENCE HISTOCHEMICAL AND MICROFLUOROMETRIC INVESTIGATIONS OF PIGMENT-FORMING SKIN TUMORS. (Ger.) Paul, E. (Zentrum fuer Dermatologie, Andrologie und Venerologie, Justus Liebig-Universitaet Giessen, D-6300 Giessen, Gaffkystr. 14, West Germany); Hartwig, H.-G.; Moeller, W.; Illig, L. *Arch Dermatol Forsch* 253(2): 125-144; 1975.

Pigment-forming skin tumors, including 26 junction nevi, 24 dermal nevi, 9 cases of Dubreuilh's disease, 22 superficial spreading melanomas, and 5 nodular melanomas were analyzed by microfluorometry and fluorescence histochemistry. Dendritic melanocytes were found in the junction nevi and spreading melanomas. Cell configurations in the nodular melanomas and dermal nevi were similar, but the former lacked the decrease in fluorescence intensity from the epidermal-dermal junction to the deep dermis characteristic of the latter. The shape of the atypical pigment cells in Dubreuilh's precancerous melanosis resembles melanocytes, and the globular cells of the superficial spreading melanoma resemble nevus cells. There is no significant difference in fluorescence spectra among the melanocytes, nevus cells, and the various melanoma cells, according to microspectographic analysis. (54 references)

5157 FORMATION OF ELASTIC FIBERS AROUND BASAL CELL CARCINOMAS: LIGHT MICROSCOPIC OBSERVATIONS. (Ger.) Berger, H. (Universitaets-Hautklinik, D-7800 Freiburg i. Br., Hauptstr. 7, West Germany); Huhner, S. *Arch Dermatol Forsch* 252(2): 119-130; 1975.

The histopathology of elastic fiber formation in basal cell carcinoma was examined in 275 randomly selected biopsies of patients 27-90 yr old. Newly formed elastic fibers were found in the tumor stroma in three characteristic formations, in 85 cases. Almost all of these featured an abundance of stromal fibroblasts. No fibers were found in areas of inflammatory exudation. There was a unique penetration of elastic fibers to all parts of the corium. Prominent also was a mast cell proliferation in the stroma; its role is unknown. It is suggested that the hyperstimulation of the fibroblasts, mimicking rejuvenation, is regulated by the overlying tumor epithelial cells. (37 references)

5158 HISTOLOGICAL CLASSIFICATION OF MALIGNANT MELANOMA IN RELATION TO PROGNOSIS AND CYTOGENESIS. (Eng.) Iversen, O. H. (Inst. Pathology, Univ. Oslo, Rikshospitalet, Oslo, Norway); Larsen, T. E.; Grude, T. H.; Magnus, K. *Adv Tumour Prev Detect Charact* 3: 260-273; 1976.

A histological study was made of specimens from 1,321 patients with the diagnosis lentigo maligna or primary malignant melanoma randomly selected from the records of the Norwegian Cancer Registry. The three pathologists involved had no previous knowledge of patient age or sex or the location of the tumor. Thirty-nine cases were classified as lentigo maligna and 62 as benign nevus. Thus, the primary diagnosis of melanoma in this material was falsely positive in 5% of the cases. Nine other malignant tumors were misdiagnosed as melanomas by the pathologist who made the first diagnosis. In 56 cases no tumor was found in the sections, in 199 specimens no conclusions could be drawn and in 127 cases a skin metastasis from a malignant melanoma was diagnosed. In 825 cases, or 62% of the material, a histological diagnosis of primary malignant melanoma was confirmed. Of these, 669 had no clinical signs of metastasis. Of the malignant melanomas, 11% could be classified as lentigo maligna melanoma, 36% as superficial spreading melanoma, and 34% as nodular melanoma; 19% of the material was unclassifiable. A survival study showed that the three histological types of malignant melanoma had significantly different prognoses. Lentigo maligna melanoma had the best prognosis, superficial spreading melanoma had a poorer prognosis, and nodular melanoma had the worst prognosis. Heavy lymphocytic infiltration was associated with a favorable prognosis, while a high mitotic count and deep invasion had a bad prognosis. The fact that the three histological types of malignant melanomas have significantly different prognoses supports the hypothesis that these tumors may have different histogenetic origins. (7 references)

5159 XERODERMA PIGMENTOSUM WITH NORMAL EXCISION-REPAIR CAPACITY AND DECREASED UV TOLERANCE. (Ger.) Sandhofer, M. (Universitaetsklinik fuer Dermatologie und Venerologie, Landeskrankenhaus, Auenbruggerplatz 8, A-8036 Graz, Austria); Tuschl, H.; Kovac, R.; Altmann, H. *Wien Klin Wochenschr* 88(9): 296-299; 1976.

The case history of a 31-yr-old woman with frank xeroderma pigmentosum and normal excision repair is reported. The patient's parents were consanguineous. The patient experienced all the customary childhood infections and was epileptic until her tenth year. Since the eighth year there was a history of light sensitivity that eventually required surgical excision of basal cell carcinomas from exposed facial areas. On initial examination the facial skin showed alternating patches of hyper- and depigmentation, telangiectasia, and circumscribed atrophy and hyperkeratosis. Basal cell carcinomas that were solid, solid-cystic, or ameloblastomatous occurred on one cheek, and papillomatous acanthosis and an inflammatory exudate with numerous melanophages were presen on the other. A melanoma was found at the nape of the neck. Loss of normal cell architecture, malignant dyskeratosis, and atypical mitoses characterized the parakeratotic, dysplastic nasal epidermis; the upper epidermis was normally keratinized with intact cells. The serology, chest radiology, urinalysis, EKG, EEG, and hematology were unexceptional. Autoradiography of the peripheral lymphocytes showed a completely normal unprogrammed DNA synthesis after γ- or UV-irradiation. However, the affected lymphocytes were more sensitive than control lymphocytes to UV exposure. The patient is thought to represent yet another genetic variant of xeroderma. (21 references)

5160 ADRENAL MEDULLARY DISEASE IN MULTIPLE ENDOCRINE NEOPLASIA, TYPE 2: PHEOCHROMOCYTOMA AND ITS PRECURSORS. (Eng.) Carney, J. A. (Mayo Clinic, 200 First St. SW, Rochester, MN 55901); Sizemore, G. W.; Sheps, S. G. *Am J Clin Pathol* 66(2): 279-290; 1976.

To test the hypothesis that diffuse adrenal medullary hyperplasia is a precursor of pheochromocytoma in multiple endocrine neoplasia, type 2, the adrenal glands of 19 patients with the syndrome were studied. The findings in the adrenal medulla in these 19 patients were: synchronous bilateral pheochromocytoma in 9 (metastatic in 3); asynchronous bilateral pheochromocytoma in 1 (metastatic); unilateral pheochromocytoma with contralateral diffuse and nodular hyperplasia in 2; unilateral pheochromocytoma with contralateral diffuse hyperplasia in 2; unilateral pheochromocytoma in 1; bilateral nodular hyperplasia in 1; bilateral diffuse hyperplasia in 1; and no abnormality in 2. This spectrum of adrenal medullary pathology suggests that diffuse and nodular medullary hyperplasias are precursors of pheochromocytoma in multiple endocrine neoplasia, type 2. (22 references)

5161 HYPERPLASTIC AND ADENOMATOUS AGE-DEPENDENT CHANGES IN THE ANTERIOR PITUITARY OF THE RAT. (Ger.) El Etreby, M. F. (Forschungslaboratorium der Schering AG, Berlin/Bergkamen, West Germany); Guenzel, P. *Verh Dtsch Ges Pathol* (59): 391-393; 1975.

Age-associated changes in the anterior pituitary lobe of senile rats are summarized. Histologically, diffuse and homogeneous hyperplasia occurs that frequently leads to adenomatous foci and obstructive hyperemia. Adenomas can be classified into alveolar, papillary, and trabecular types. The tumor parenchyma is often perfused by extensive hemorrhage, which is explained by increased capillary fragility due to rapid tumor growth. Tumor cells are usually well-differentiated, with large, sometimes pyknotic nuclei. The prolactin cell is the dominant element in spontaneous hyperplasia or adenoma, similar to the case in estrogen-induced tumors. (7 references)

5162 A NEW LOOK AT PITUITARY ADENOMAS: STRUCTURE ELUCIDATING FUNCTION. (Eng.) Sirek, A. M. (Dept. Pathology, Univ. Toronto, Banting Inst., Rm. 135, 100 College St., Toronto, ON M5G 1L5, Canada); Corenblum, B.; Horvath, E.; Rewcastle, B.; Ezrin, C.; Kovacs, K. *Can Med Assoc J* 114(3): 225-229; 1976.

Seven cases of surgically resected pituitary adenomas, each a different type, are described. They include tumors that secrete prolactin or growth hormone or both, nonfunctioning tumors (undifferentiated and oncocytic), and one tumor with cells of the adrenocorticotropic hormone-melanocyte-stimulating hormone type. Because of the danger of misdiagnosis if only the clinical and biochemical signs of pituitary disease are considered, it is recommended that the final interpretation be made after thorough morphologic studies using routine staining and light microscopy together with immunostaining and electron microscopy to complement the biochemical, radiologic, and clinical evaluation. (20 references)

5163 DEFINITION AND DIFFERENTIAL DIAGNOSIS OF CHROMOPHOBE PITUITARY ADENOMAS. LIGHT AND ELECTRON MICROSCOPIC STUDIES. (Ger.) Saeger, W. (Pathologisches Institut, Universitaet Hamburg, Martinistr. 52, D-2000 Hamburg 20, West Germany); Breuer, H.; Luedecke, D. *Beitr Pathol* 157(4): 367-390; 1976.

Criteria for the differential diagnosis of chromophobe from chromophil pituitary adenomas, the relation between granulation type and clinical picture, and the selection of histological methods for demonstrating adenoma endocrine activity are discussed. The data are based on 108 randomly chosen pituitary tumors from patients with different clinical syndromes. Light microscopy identified 20 acidophil, 5 mucous cell, and 19 oncocytic adenomas. The remaining 64 chromophobic or weakly acidophilic sections were assayed semiquantitatively. Although chromophobe tumors tended toward increased necrosis and higher concentrations of lysosomal lipid-pigment complexes, a crucial difference could be detected in granulation. Chromophobe cells were completely deficient in secretory granules 500 μm or more in size and had significantly fewer granules 200-300 μm in size. They also had more 100-μm granules than acidophilic cells. Differences in capillary composition, cell size, membrane resolution, nucleolar size, length of cell processes, microvilli, cytoplasmic filaments, microtubules, and rough endoplasmic reticulum were insignificant. There was no evidence of hyperfunction in patients with chromophobe tumors; there was a correlation of the acidophilic cells with acromegaly. However, half of the 34 clinically inactive, chromophobe tumors contained cells with highly developed Golgi fields and rough endoplasmic reticulum, suggesting secretion of an ineffective polypeptide. (36 references)

5164 ANATOMICAL AND CLINICAL CONSIDERATIONS OF THE PHYLLODE TUMOR OF THE MAMMARY GLANDS. (Ger.) Gavrilescu, C. (6600 Iasi, Nicolae-Gane-Str. 24, Rumania); Cernea, M.; Tarabuta-Cordun, G. *Zentralbl Gynaekol* 98(2): 123-127; 1976.

The case history of a 43-yr-old female with a phyllode mammary tumor is presented. Trauma to the left breast was associated with a small painless nodule for 18 mo. Rapid growth to a 10- x 8-cm tumor during the year following led to clinical intervention. The freely movable mass varied in consistency, but was usually hard. Axillary nodes were not enlarged, but the breast muscle was infiltrated. The tumor was not encapsulated and consisted of several lobes separated by deep fissures containing a gelatinous substance. The glandular and connective tissues were hyperplastic. The stroma was mainly fibroblastic, with a plethora of fibers. Two other case histories of a phyllodal tumor were discovered retrospectively. In one, the stroma consisted of connective tissue cells with massive nuclei of a sarcomatous appearance. This mesenchymal component is probably responsible for the infrequent malignancy of the tumor. It is also likely that the tumor develops from a precursor tumor, particularly a fibroadenoma. (14 references)

5165 MAMMARY CARCINOMA IN AN ACROMEGALIC PATIENT. (Eng.) Induruwa, P. A. C. (Colombo North General Hosp., Ragama, Sri Lanka); Perera, M. *Br J Clin Pract* 30(4): 93-94; 1976.

The case history of a postmenopausal acromegalic patient with a stage II mammary carcinoma is reported. Malignant diseases are not common with acromegaly. Evidence is presented that supports the possibility that the tumor depends on pituitary hormones. Acromegaly is associated with excess secretions of growth hormone and prolactin. High levels of these hormones are known to increase the incidence of mammary hypertrophies and cancers. The exact role of the pituitary in the carcinogenesis of the human breast is not known. (8 references)

5166 ESTROGEN EXCRETION AND THE CONTENT OF SEX CHROMATIN IN TUMOR CELLS OF PATIENTS WITH BREAST CANCER. (Rus.) Tsygan, V. M. (Moldavian Res. Inst. Oncology, Kishinev, USSR); Russu, I. D.; Skul'skaia, S. F. *Vopr Onkol* 21(11): 26-29; 1975.

The hormonal balance in 62 patients with breast cancer and 40 healthy subjects during menstruation and menopause was studied and it was correlated with the presence of sex chromatin in tumor cells. All patients with breast cancer demonstrated broad individual variations in estrogen excretion. Patients showed decreased diurnal excretion of estrogens during menstruation compared with controls. During menopause, a decrease in diurnal estrone and estradiol excretion was found. The observed changes in hormonal balance indicate a decreased ovarian function in breast cancer related to a low (less than 20%) number of tumor cells with sex chromatin.

5167 ESTROGEN DEPENDENCE OF THE PREGNANCY-ASSOCIATED α_2-GLYCOPROTEIN SP_3 AND ITS OCCURRENCE IN SERA OF PATIENTS WITH DIFFERENT MALIGNANT AND BENIGN DISEASES. (Ger.) Neppert, J. (Bernhard-Nocht-Institut fuer Shiffs- und Tropenkrankheiten, BRD-2 Hamburg 4, Bernhard-Nocht-Strasse 74, West Germany); Hoffman, L. *Folia Haematol Leipzig* 102(4): 418-430; 1975.

Serum levels of the pregnancy-associated α_2-glycoprotein SP_3 were measured in 127 patients with malignant tumors, 39 patients with benign disease (such as Australia antigen-positive hepatitis, schistosomiasis, toxoplasmosis), 17 women on oral contraceptives or estrogen management, and 50 subjects without malignant disease or exposure to exogenous estrogens. SP_3 serum concentrations were significantly elevated in all 17 women receiving exogenous estrogen, in 26% of the patients with benign disease, and in 52% of the patients with malignant tumors who had received no estrogen therapy. Sera from patients with bronchial, endometrial, and ovarian cancer were SP_3 positive, while sera from patients with hepatoma or gastric adenocarcinoma were negative. Women with malignant tumors had SP_3 serum levels 30% higher than those of men with cancer. No SP_3 was detectable in healthy subjects or untreated patients without malignant disease. The results indicate that serum SP_3 concentrations are markedly influenced by exogenous estrogen and, in the case of bronchial and uterine cancer, by the increased production of endogenous estrogen.

5168 PROLACTIN ADENOMA REVEALED BY A TWIN PREGNANCY AFTER CLOMIPHENE THERAPY. HYPOPHYSECTOMY DURING 5TH MONTH OF PREGNANCY. (Fre.) Wolf, L. M. (Hopital de Boisguillaume, CHU, F 76000 Rouen, France); Houdent, C.; Peugnet, J. P.; Courtois, H.; Peillon, F. *Ann Endocrinol (Paris)* 36(2): 107-108; 1975.

A 25-yr-old woman had galactorrhea and secondary amenorrhea since her first pregnancy at 20 yr. She underwent several clomiphene treatments: 100 mg/day x 5 days led to spontaneous menstruation for 1 mo with temporary disappearance of the galactorrhea; 100 mg/day x 5 days 8 and 11 mo later led to spontaneous menstruation for 2 mo, a gravidic amenorrhea, and a pregnancy discovered 4 mo later. Headaches and bitemporal hemianopia required a hypophysectomy during the fifth month. A prolactin adenoma with hemorrhagic lesions was discovered. The patient gave birth to normal twins during the eighth month. Vision was restored and hypophyseal function partially recovered during the following 2 yr, and menstruation cycles resumed. However, galactorrhea and hyperprolactinemia reappeared. The unusual occurrence of a pregnancy during an amenorrhea-galactorrhea syndrome of tumoral origin indicates a presistent and sufficient amount of gonadotropins, the spontaneous cyclical release of which was inhibited. The inducer role of clomiphene is supported by the chronology and the nature (twin) of the pregnancy. (4 references

5169 A CASE HISTORY OF OVARIAN CARCINOMA IN MONOZYGOTIC TWINS. (Ger.) Zahn, U. (Zentrum Operative Medizin I, BRD-23 Kiel 1, Hegewischst 4, West Germany); Philipp, E. *Zentralbl Gynaekol* 98(7): 418-420; 1976.

The case history of a rare bilateral ovarian carcinoma, partly a papillary-cystic adenoma and partly solid, in a 51-yr-old woman whose identical twin had succumbed earlier to the same tumor is presented. There was a maternal history of cancer. Upon pelvioscopy because of an enlarged ovary, a fist-sized, partly cystic, partly solid right ovarian tumor and a chestnut-sized left ovarian tumor of the same consistency attached to the sigmoid colon and the left pelvic wall were found. Hysterectomy and bilateral annexectomies followed, with histological confirmation. A heritable disposition toward invaginating cell clusters derived from the epithelium of the embryonic paramesonephric coelom is mentioned as a potential mechanism. (9 references)

5170 THE CHARACTERIZATION OF MALIGNANT OVARIAN TUMORS BY IMPULSE CYTOPHOTOMETRY. (Ger.) Krug, H. (Pathologisches Institut, DDR - 701 Leipzig, Liebigstr. 26, East Germany); Ebeling, K. *Arch Geschwulstforsch* 46(3): 214-224; 1976.

Impulse cytophotometric (ICP) karyograms of 31 adnexal malignancies and 1 ovarian carcinoma were studied to relate ploidy and DNA frequency. The adnexal population included 1 granulosa cell, 1 embryonic teratoma, 1 carcinosarcoma, 1 tubular carcinoma, and 27 ovarian carcinomas. There were 14 diploid cases with a maximum DNA peak at 2c and smaller peaks at 4c. Nine were polyploid, with further maxima at 4c and 8c but no orthoploid peaks at 16c. Four tumors were tetraploid, with maxima at 4c and other peaks at 2c or 8c, and four were aneuploid, with doubling rhythms starting somewhere between 2c and 4c. The fibroma suspension yielded only one small 4c peak. The polyploidy levels in this sample were higher than expected or previously reported. It is likely that tetraploid or peritetraploid cells, which have originated from endomitosis, are in a synthetic phase that elevates the DNA content to 8c. Most cells remain in G2, the premitotic phase, with only random mitoses occurring. (35 references)

5171 ELASTIC FIBERS OF THE CERVICAL STROMA IN PRECANCER AND CANCER. (Rus.) Murav'ev, G. N. (Res. Inst. Oncology and Medical Radiology, Ministry Health BSSR, Minsk, USSR). *Vopr Onkol* 21(10): 26-34; 1975.

The operative and biopsy material from cancerous and precancerous tissue from the uterine cervix was examined to determine the kinetics of changes in elastic fibers. Normal tissue showed interconnected and complementary systems of elastic fibers. With the development of precancer and cancer, complex restructuring of cellular and noncellular components of the connective tissue took place, with elastic fibers undergoing a series of gradually increasing changes ranging from superficial, reversible to profound, and finally to irreversible, with eventual total destruction. These changes were dependent upon the direct action of proliferating and neoplastic epithelia as well as the state of other components of connective tissue, among them collagen fibers. Elastic fibers in precancer and cancer of the uterine cervix are primarily pre-existing, but some new growth can occur in proportion to the maturation of the stroma.

5172 FREQUENCY OF EPITHELIAL CHANGES IN THE CERVIX UTERI OF TEENAGERS AND YOUNG WOMEN. (Ger.) Steps, H. (Evang. Krankenhaus, 5 Koeln 41, Weyertal 76, West Germany); Zinser, H. K. *Fortschr Med* 94(2): 55-57; 1976.

From 1967 to 1974, suspected and positive cervical smears of 45,983 teenage girls and young women up to the age of 25 were analyzed for diagnostic value and compared with those of a group over 25 yr of age. There were 250 suspected or confirmed findings in the under-25 group. In the 15-25 age group, 72% were Pap III, 23% Pap IV, and 5% Pap V (the Pap V category disappeared from the group between 1971 and 1974). In a 15- to 19-yr-old subgroup, 88% were Pap III and 12% were Pap IV. In the over-25 subgroup for 1971-4, 47% were Pap III, 34% Pap IV, and 19% Pap V. Histological findings were available in 46 of 67 positive smears for the 15-25 age group from 1967 through 1973. In the Pap IV classification there were 30 preinvasive and four invasive carcinomas. Eight in situ and four invasive carcinomas were matched with Pap V. In the teenage group of 5,391 smears, Pap IV was diagnosed three times and Pap V not at all. Two of the three positives presented with carcinoma in situ. (10 references)

5173 CYTOGENETIC STUDIES OF PREINVASIVE LESIONS AND INVASIVE CARCINOMAS OF THE CERVIX UTERI. I. NUMERICAL CHROMOSOMAL ABNORMALITIES. (Ger.) Dehnhard, F. (D-6090 Ruesselsheim, Stadtkrankenhaus, West Germany); Breinl, H.; Schuessler, J.; Wehler, V. *Arch Gynaekol* 220(2): 123-138; 1975.

Cytogenetic and karyotypic studies were carried out on 54 women with precancerous lesions or frank cervical carcinoma. The chromosome number in nine dysplasias of different degree varied only slightly from the normal 46, mainly toward hypoploidy. A wider spectrum around the norm occurred in 25 cases of preinvasive carcinoma, with a slight tendency to hyperploidy. Microinvasive carcinoma in situ (four patients) showed a very wide distribution, with somewhat more hyperploid than hypoploid cells. In 16 cases of squamous cell carcinoma (stages IIa-IIb), the ploidy spectrum ranged between 34 and 94. Hyperploidy was more frequent than hypoploidy, with triploid cells predominant. (No references)

5174 CYTOGENETIC STUDIES OF PREINVASIVE LESIONS AND INVASIVE CARCINOMAS OF THE CERVIX UTERI. II. STRUCTURAL CHROMOSOMAL ABNORMALITIES AND KARYOTYPIC DEVIATIONS. (Ger.) Dehnhard, F. (D-6090 Ruesselsheim, Stadtkrankenhaus, West Germany); Breinl, H.; Schuessler, J.; Wehler, V. *Arch Gynaekol* 220(2): 139-159; 1975.

The karyotypes of 3 dysplasias, 14 preinvasive carcinomas, 3 microinvasive carcinomas, and 12 squamous cell carcinomas were analyzed. Of 12 dyplastic cells, 5 had the normal chromosome number, of which only 2 were authentic diploids; the remainder were pseudodiploid. Of 63 preinvasive cells, 5 were normal diploid, 6 were pseudodiploid, and the remainder were variously deviant; the C group was hyperploid and the B, D, and G groups were hypoploid. No true diploids were found in 20 microinvasive metaphases; the C group was hyperploid and all other groups were hypoploid. Normal diploid cells were rare in 173 squamous carcinoma cells; the C group was hyperploid and the B, D, and G groups were hypoploid, with a plethora of fragments, minutes, and double minutes. The difference in ploidy and structural anomaly between preinvasive and invasive cancer is one of degree. (No references)

5175 VAGINAL ADENOSIS (A REPORT OF 6 CASES, INCLUDING 2 CASES OBSERVED FOLLOWING DIETHYLSTILBESTROL TREATMENT AT FETAL AGE). (Fre.) Henry-Suchet, J. (No affiliation given); Seneze, J.; de Brux, J. *Gynecologie* 26(2): 95-102; 1975.

Vaginal adenosis, characterized by the presence of glandular epithelium and now associated with adenocarcinoma, was once a very rare illness. Since 1965, it has appeared in the US among girls from 13 to 25 whose mothers received diethylstilbestrol (DES) during pregnancy. European medical literature includes very few examples of adenocarcinoma. This article describes six cases of benign adenosis observed in France in recent years. Three involved adult women born before the start of DES therapy. Among the three younger girls, two had received DES in utero; the early history of the third one is unknown. Adenosis, often latent, may be difficult to recognize. The six women had seen competent gynecologists who diagnosed other ailments. Only the combination of histology and colposcopy resulted in the identification of adenosis. In 2/6 cases, the adenosis was associated with a diaphragm. It seemed to evolve into persistent vaginitis with intense dyspareunia. The possible introduction of DES into the fetus through the diet (poultry) was considered. Benignity itself may be something of a puzzle. The cytology was normal in all six patients, but vaginal cytology is not necessarily reliable in the presence of adenocarcinoma; hence the need for successive biopsies. Surgical ablation of the lesions through excision of the vaginal mucous membrane may seem too drastic for a benign lesion in a teenage girl. A systematic search for and examination of girls from 5 to 25 who may have been exposed to DES in utero is recommended. (31 references)

5176 MYCOPLASMA COLONIZATION IN GYNECOLOGICAL CARCINOMAS AND THEIR PRECURSORS. (Ger.) Rutke, J. (II. Frauenklinik, Universitaet Muenchen, Lindwurmstrasse 2a, D-8000 Munich 2, West Germany); Weissenbacher, E.-R.; Penning, W.; Frank, S. *Med Klin* 71(20): 865-868; 1976.

Smears were prepared either from tumor tissue or from the portio vaginalis and lateral vaginal walls in 190 women, and 26 instances of mycoplasma were discovered. Thirty-three patients with suspected carcinoma (Papanicolau groups III, IV, IVa, and V) presented with five T strains and three of *Mycoplasma hominis*. In 87 women with cervical carcinoma there were 3 recoveries of T strains and 10 of *M. hominis*. Two T strains and one *M. hominis* strain were found in 49 endometrial carcinomas. One instance each of the T and *M. hominis* strains was isolated from 11 cases of ovarian carcinoma. The total of both suspected and confirmed cases of cervical carcinoma shows a 17% mycoplasma infestation (both strains) contrasted with 8% for the combined ovarian and endometrial carcinoma samples. (48 references)

5177 EXPERIENCE WITH 40,000 PAPANICOLAOU SMEARS. (Eng.) Sandmire, H. F. (OB-GYN Associates of Green Bay, Ltd., 704 S. Webster Ave., Green Bay, WI 54301); Austin, S. D.; Bechtel, R. C. *Obstet Gynecol* 48(1): 56-60; 1976.

Forty thousand consecutive cytologic smears and subsequent diagnostic procedures were reviewed. They resulted in the diagnosis of 41 carcinomas in situ, 35 microinvasive and invasive carcinomas, and 24 severe dysplasias, for a yield of significant neoplasia of one lesion per 400 Papanicolaou smears. Twenty-five of the carcinomas in situ and nine microinvasive and invasive carcinomas were diagnosed in patients with atypical smears, indicating that all patients with persistent atypical smears require evaluation by tissue examination. Of the 119 patients subjected to conization, 78% either had carcinoma in situ, microinvasive and invasive carcinoma, or significant cervical dysplasia. Postoperative complications following conization were negligible. There were no postconization deleterious effects on three concurrent and nine subsequent pregnancies. A history of gonorrhea places a patient at a higher risk of developing cervical carcinoma. Annual performance of cytologic smear evaluation is indicated in all sexually active women and in all virginal women over 20 yr of age. (16 references)

5178 DYSGERMINOMA IN TURNER'S SYNDROME. (Eng.) Rehder, H. (Abteilung fuer Pathologie der Medizinischen Hochschule, Ratzeburger Allee 160, D-2400 Lubeck, Germany); Melcher, T. *Beitr Pathol* 157(3): 251-259; 1976.

The importance of the Y-chromosome for germ cell tumor development in gonadal dysgenesis has been emphasized many times. Only two cases of dysgerminoma or gonadoblastoma in the XO-Turner's syndrome had been published previously. This is a report of a third case. A 38-yr-old woman with Turner's syndrome developed a dysgerminoma in a gonadal streak. No Y-chromosome containing stemline could be detected in the patient or in the tumor. The conditions brought about by an early onset of ovarian degeneration could well represent a causative factor of the development of the tumor as in this patient. She had had a 6-yr period (ages 28-34) of therapeutic hormonal substitution for primary amenorrhea. The compound prescribed was Primosiston, a mixture of estrogens and gestagens.

5179 COMPARATIVE STUDIES OF SATELLITE ASSOCIATION AND SOME MARKER CHROMOSOMES IN CERTIFIED AND SUSPECTED HELA CELLS. (Eng.) Hansson, A.

(Cancer Chromosome Lab., Inst. Genetics, Univ. Lund, -223 62 Lund, Sweden); Heneen, W. K. *Hereditas* 82: 49-256; 1976.

atellite association (SA) patterns were studied in ive human cell lines: HeLa, Lu106, KB, HEp-2, and 98/AH-2. Study of the mean number of SA complexes er cell and the proportion of the normal acrocenrics involved in SA in each cell indicated that u106 and KB constituted one group and HEp-2 and 98/AH-2 another group. HeLa had some identities ith both groups, but it was more similar to Lu106 nd KB than to the other cell lines. The mean numers and the standard errors of the different normal crocentric chromosomes per cell were calculated. he standard errors of the acrocentrics were ranked n each cell line. The association tendencies of hese chromosomes were ranked in the same manner. here was high positive correlation between these spects, possibly indicating that a high SA tendency influences nondisjunction. Some marker chromosomes ere found in associationlike configurations with ormal acrocentrics. These associations were found ost frequently with those markers that possibly include the short arm and other parts of normal crocentric chromosomes. The results indicate a ossible common origin of the five cell lines studied. (11 references)

5180 BLOOM'S SYNDROME. II. THE PROTOTYPE OF HUMAN GENETIC DISORDERS PREDISPOSING TO HROMOSOME INSTABILITY AND CANCER.

(Eng.) German, J. *n: Chromosomes and Cancer.* Edited by J. German. (New York: John Wiley & Sons): pp. 601-617; 1974.

he features of Bloom's syndrome are summarized and ata from a long-term program of cancer surveillance mong a cohort of 50 affected persons are tabulated. genetic analysis of this condition indicates autosomal recessive inheritance. Short-term blood lymphoyte cultures display an increased incidence of etaphases with various types of chromosome arrangeents. The most characteristic of these aberrations, a quadriradial configuration, is present in 0.5% to 14.0% of all dividing phytohemagglutinin-stimulated ymphocytes. Bloom's syndrome can be viewed as the rototype of a class of rare genetic disorders that hare chromosome instability and a predisposition to ancer. Some of the genes associated with this class f disorders might also affect the heterozygote, erhaps producing a predisposition to cancer. Some ight have weak effects and figure in the polygenic inheritance of cancer, while others might be strongly procancer, in which case a pattern of dominantly inherited cancer would emerge. (27 references)

5181 IMPULSE CYTOPHOTOMETRIC INVESTIGATIONS ON TUMOUR MATERIAL.

(Ger.) Krug, H. (Pathologisches Institut, Karl-Marx-Universitaet, DDR-701 Leipzig, Liebigstrasse 26, East Germany). *Arch Geschwulstforsch* 46(2): 110-115; 1976.

Certain sources of error inherent in the interpretation of impulse cytophotometric (ICP) karyograms are discussed. These include the specificity of color reactions; confusion in distinguishing diploid from tetraploid peaks; fixation methods of choice; cell clumping, wherein two or more nuclei are counted as one; interference by detritus, where small particles lie underneath diploid nuclei; and the use of independent methods in evaluating karyograms. The variability in the proliferation dynamics of tumor cells is demonstrated approximately by ICP, after alcohol fixation and ethidium bromide staining. Examples are selected from clinical material. Rapidly proliferating tumors, such as gastric carcinoma, yield a high 4-c peak, suggesting tetraploidy; an 8-c peak, indicating a shift from tetraploid to octoploid nuclei, was found in bronchial carcinoma and brain metastases. In especially virulent sarcomas a 16-c peak has even been recorded. However, the peaks are not unequivocal measures of polyploidy, because of changes in cell cycle duration or the extrachromosomal control of cell division. The procedure is only effective as a supplement to direct microscopic screening in exfoliative cytology or karyological assays. (25 references)

5182 INTRACRANIAL GERMINOMAS: A CASE REPORT.

(Eng.) Fan, K.-J. (Dept. Pathology, Howard Univ., Washington, DC); Agbata, A. *J Natl Med Assoc* 68(4): 309-311; 1976.

A case report of a 23-yr-old unmarried black woman with multifocal intracranial germinomas is reported in an attempt to clarify the pathogenesis and biological behavior of this uncommon tumor. The patient was originally admitted because of amenorrhea and polydypsia; she began to have varying periods of hypothemia and fever 15 wk after admission, subsequently became unconscious, and expired 4 mo after admission. Autopsy revealed a large infiltrative suprasellar tumor involving the optic chiasm, the floor of the third ventricle, and the hypothalamic areas. The fornix and the adjacent brain tissue were also infiltrated by the tumor. Microscopically, the suprasellar tumor was identical to a testicular seminoma. Multiple sections of the pineal region revealed degenerative fibrocollagenous tissue that was infiltrated by lymphocytic cells. The coexistence of a large suprasellar germinoma and a microscopic germinoma in the degenerated pineal region may cast some light on the pathogenesis and biological behavior of this tumor. Since the presence of lymphocytic cells in seminoma or intracranial germinomas has been recognized as a phenomenon of immune response to tumor cells, the degenerative process with lymphocytic infiltration in the pineal region probably represented a successful immune response that was able to destroy most of the tumor tissue. The significance of the case is twofold. First, since pineal bodies have not been examined histologically in many routine autopsies, it is conceivable that some grossly unrecognizable small germinomas or other tumors in the pineal region have been overlooked. Second, if the degenerated tissue in the pineal region was truly due to a successful immune response, the possibility of immunotherapy for seminoma or intracranial germinoma might be feasible clinically. (24 references)

5183 GRANULAR CELL TUMORS OF THE CENTRAL NERVOUS SYSTEM OF RATS. (Eng.) Hollander, C. F. (Inst. Experimental Gerontology TNO, 151 Lange Kleiweg, Rijswijk (ZH), The Netherlands); Burek, J. D.; Boorman, G. A.; Snell, K. C.; Laqueur, G. L. *Arch Pathol Lab Med* 100(8): 445-447; 1976.

The occurrence of 12 cases of granular cell tumors in the brains of rats of different inbred strains is reported. The tumors were observed in both untreated and treated animals of the following strains: BN/Bi (four females, two males), (BN X WAG/Rij)F_1 (two males), SD (one male), OM (one male), F_{344} (one female), and BUF (one male). The ages of the animals at the time of death ranged from 15-40 mo. Treatments ranging from administering methylazoxymethyl acetate to the mother during gestation, adding cycasin or aflatoxin to the diet, or injecting sodium iodine ^{125}I did not influence the occurrence of the tumors. All 12 cases showed the characteristic histologic features of granular cell tumors; except for 2 cases, all tumors were circumscribed and sharply demarcated from the surrounding tissue, suggesting a benign nature. In one of the two exceptions, tumor cells were observed around small blood vessels some distance from the original tumor; in the other exception, small tumor cell nests were found in the brain tissue outside the main body of the tumor. Metastases were not found in any of the rats. All tumors were in contact with the leptomeninges at some point, and their development from Schwann cells of small perivascular nerves in the leptomeninges and in the central neural tissue can neither be excluded nor proved. Granular cell tumors in the CNS of aging BN/Bi rats do not appear to be rare, based on the present study. (10 references)

5184 THE ULTRASTRUCTURAL LOCALIZATION AND DISTRIBUTION OF FREE CHOLESTEROL (3β-HYDROXYSTEROL) IN HUMAN CEREBRAL TUMORS. (Ger.) Slowik, F. (Institut fuer Neurochirurgie, H-1145 Budapest, XIV, Amerikai ut 57, Hungary); Oekroes, I. *Acta Histochem (Jena)* 55(1): 89-97; 1976.

Light and electron microscopic detection of the cholesterol distribution in cells from one human astrocytoma, two oligodendrogliomas, and four polymorphous glioblastomas is reported. In the gliomas the digitonin-cholesterol crystals occurred mainly in the cysts and rarely in nuclear areas. Cholesterol was absent from the microglia lipid. Positive cholesterol was localized mainly in the degenerating cells of the oligodendrogliomas. In the glioblastomas, the crystals were extracellular along the cell wall and between the organelles in the periphery of the cells adjacent to the cysts. Based on a literature consensus, the data suggest that nondegenerative tumor cells contain cholesterol bound to some intracellular structure; there is no difference between benign and malignant localizations. In degenerating cells, the cholesterol is mostly free in cysts or vacuoles. Similar to myelin decomposition, the free cholesterol is esterified by the microglial cells after pinocytosis. (14 references)

5185 HUMAN NONEPITHELIAL TUMORS IN NUDE MICE: MORPHOLOGY AND GROWTH CHARACTERISTICS. (Ger.) Torhorst, J. (Institut fuer Pathologie der Universitaet, Schoenbeinstrasse 40, CH-4056 Basel, Switzerland); Tao, T. W.; Floersheim, G. L. *Schweiz Med Wochenschr* 106(22): 757-760; 1976.

A human glioblastoma (GB) and an osteosarcoma (OS) were transplanted in 8-wk-old nude mice, Balb/c, nu/nu, to study the tumor morphology and growth characteristics. Fragments of an untreated femoral GB from a 14-yr-old girl and an untreated OS from the temporal pole in a 48-yr-old man were transplant serially over 22 and 14 mo, respectively, without metastasis. The OS, which was undifferentiated, showed cellular polymorphism, whereas the GB partially resembled a primary tumor but showed greater polymorphism. Essentially, after several passages, both tumors histologically resembled the parent tumor. After a dormant period of 20 days, the OS grew more rapidly than the GB, with a dormant period of 60 days. This indicates that the tumor and not the host is essentially responsible for differing tumor aggressiveness in nude mice. (14 references)

5186 CARDIAC GLOMUS TUMOR. LIGHT AND ELECTRON MICROSCOPIC INVESTIGATIONS. (Ger.) Riesner K. (Pathologisches Institut der Universitaet Hambur D-2000 Hamburg 20, Martinistrasse 52, West Germany); Boecker, W. *Z Krebsforsch* 84(1): 59-66; 1975.

The histology of a neuromyoarterial (glomus) cardiac tumor in a 28-yr-old female is presented. After a 4-yr history of cardiac pain, thoracotomy disclosed a 6- x 5-cm tumor in the cardiac apex and anterolateral walls of the left ventricle. The extracutaneous localization is unique. The tumor endothelium showed ultrastructural transitions to smooth muscle (myodifferentiated) and pericytic-differentiated (epithel oid) cell types, each of which is considered precancerous. The endothelial cell composition varied little from normal capillary endothelium, with numer ous dense and attachment bodies, micropinocytotic processes, and ordered mitochondrial groups. The primitive vascular mesenchyme is indicted as the origin of glomus tumors. (16 references)

5187 MORPHOLOGICAL CHARACTERISTIC OF PERIFOCAL CHANGES IN CANCER OF THE LUNGS. (Rus.) Andreev, M. D. (Khmelnitsky District Hosp., Melnitsky, USSR). *Vrach Delo* (12): 59-63; 1975.

The histology and histochemistry of malignant lungs removed surgically from 65 patients and the perifocal changes that occurred are discussed. Tumor nodules were peripheral in 28 cases, central in 22, and diffuse in 15. Six presented with adenocarcinoma and 39 with squamous cell type carcinoma; 22 were poorly differentiated. Perifocal inflammation in both central and peripheral cancer occurred in discrete areas around the tumor nodule. The most striking changes, especially in the central localization, involved contraction of the bronchial opening by ndobronchial tumor growth. The partial occlusion vas usually surrounded by a zone of atelectasis, vhich passed into a wider zone of dystelectasis and edema, hemorrhage, and a broad area of emphysema. listologically, the squamous cell type formed nodules of considerable size, often destructively, which led to ulcerative bronchial stenosis. The clinical picture of poorly differentiated cancer was often associated with acute pneumonic areas of edema, hemorrhage, vascular stasis, and lymphatic collapse both near and remote from the tumor. Perifocal changes are inflammatory sequelae, and not precursors, of tumor presence. Their signs and symptoms should elicit early suspicion of cancer and not lead merely to conventional symptomatic treatment.

5188 BRONCHOALVEOLAR ADENOCARCINOMA IN PULMONARY FIBROSIS DUE TO MITRAL STENOSIS. (Cro.) Plamenac, P. (Institut za patolosku antamiju Medicinskog fakulteta, Sarajevo, Yugoslavia); Selak, I.; Ademovic, S.; Markovic, Z. *Plucne Bolesti Tuberk* 27(3): 169-174; 1975.

A case of bronchoalveolar adenocarcinoma in a 39-yr-old man with mitral stenosis is reported. The lungs showed chronic interstitial fibrosis. It is believed that the development of the alveolar carcinoma was due to an abnormal proliferation of the bronchoalveolar epithelium in the fibrous lungs. It is also suggested that the tumor and the heart lesions were causally linked. (30 references)

5189 A CASE OF PULMONARY LYMPHANGIOMATOSIS. CLINICAL, HISTOLOGICAL AND ULTRASTRUCTURAL ASPECTS. (Fre.) Molina, C. (Clinique de Pneumo-Phtisiologie, Hopital Sabourin, B.P. 12, La Plaine, 63018 Clermont-Ferrand, France); Roche, G.; Baguet, J. C.; Cheminat, J. C.; Petit, R.; Chevalier, A.; Quintana, M.; Bourges, M. *Rev Fr Mal Respir* 4(1): 49-60; 1976.

A case of a 30-yr-old woman with recurrent spontaneous bilateral pneumothorax as a result of lymphangiomatosis is reported. The first pneumothorax occurred when the patient was 7 mo pregnant. About a year later, after two more incidents, she entered the hospital with a high fever, dyspnea, and a chylous pleural effusion that required numerous evacuations. A diffuse reticulonodular shadow was seen on x-ray of the lung. The diagnosis was made by lymphography, which revealed an obstruction at the L4 level and a complete disorganization of the iliolumbar lymphatic system. The downhill course of the disease was rapid. Chylous ascites developed, followed by rhinopharyngeal chylous drainage progressing to respiratory failure and death. On autopsy, destruction of the lung parenchyma and bilateral subpleural lymphangiectasis with numerous cystic dilations were observed. Ultrastructural studies showed the absence of smooth muscle cells in the wall of the lymphatic cysts. Mechanical and embryological theories explaining the mechanism of the cystic dilations of the lymphatic system are discussed. Thromboembolic accidents during pregnancy may play a role. (25 references)

5190 INTERCELLULAR JUNCTIONS AND OTHER CELL SURFACE DIFFERENTIATIONS OF H4-IIE HEPATOMA CELLS IN VITRO. (Eng.) Porvaznik, M. M. (Coll. Medicine, Dept. Physiology, Univ. California, Irvine, CA 92664); Johnson, R. G.; Sheridan, J. D. *J Ultrastruct Res* 55(3): 343-359; 1976

Cells of the H4-II-E line, derived from the H35 rat hepatoma, retain a number of the differentiated features of normal hepatocytes. Individual cultures contain both monolayer and stratified regions. Intercellular junctions and surface differentiations in both regions of the cultures were investigated with a variety of electron microscope techniques. Gap junctions resembled those in normal liver but were smaller and occurred infrequently. In situ fracturing methods revealed rectilinear arrays of particles in the apical (exposed) surfaces of the cultures. The tight junction forms varied in complexity from linear fibrils to continuous, circular forms that appeared to occlude extracellular, spherical pockets between individual pairs of cells. The complex forms, particularly the continuous, circular forms, were more common in stratified regions of the culture. Microvilli extended into the pockets, which probably correspond to structures seen in sections. The pockets excluded colloidal lanthanum, and their membranes were strongly stained with the Wachstein-Meisel ATPase method. (48 references)

5191 RESULTS OF A STUDY OF 17 CASES OF LONG-TERM EXPOSURE TO VINYL CHLORIDE. (Ger.) Mueller, K. T. (Med. Univ.-Klinik, 5 Koeln 41, Joseph-Stelzmann-Str. 9, West Germany); Buchter, A.; Gross, R.; Bolt, W. *Med Welt* 27(1): 21-24; 1976.

A discussion of the physicochemical properties of vinyl chloride (VC) and its toxicology precedes a review of 17 patients with VC intoxication. Liver pathology and positive Raynaud signs occurred in 11/17, esophageal or fundic varices in 8/17, splenomegaly in 8/17, thrombocytopenia in 10/17, and acro-osteolysis in 8/17. Six probands presented with granulo cytopoiesis and marrow stimulation by sternal puncture. Five patients had various changes in antibody composition, and six were leukopenic. All patients were otolaryngologically negative. A suspicion of hepatic hemangioendothelioma in one subject was not confirmed on laparoscopy, although the patient had elevated serum iron and distal hypalgesia. The subjects were men, with a mean 9-yr VC exposure. (48 references)

5192 LIVER DISEASE IN POLYVINYL CHLORIDE PRODUCTION WORKERS--CLINICAL AND LAPAROSCOPIC ASPECTS. (Ger.) Marsteller, H. J. (Medizinische Universitaetsklinik, D-5300 Bonn-Venusberg, West Germany); Lelbach, W. K.; Mueller, R.; Gedigk, P.; Lange, C. E. *Leber Magen Darm* 5(5): 196-202; 1975.

Clinical and histopathological findings in suspected occupationally induced liver and spleen disease among 44 workers engaged in vinyl chloride polymerization are presented. Palpable hepatomegaly and splenomegaly were found in 28 and 16 patients, respectively. A considerable BSP retention, low grade hyperbilirubinemia, and transient elevation in SGOT, SGPT, and alkaline phosphatase were the only remarkable biochemical variables. The majority had pronounced thrombocytopenia, with platelet dysfunction. Hepatic fibrosis with encapsulated vascularization was conspicuous in 35 probands; a nodular liver surface and portal hypertension were also present. Liver histopathology was not conspicuous. Adaptive hepatocyte focalization, nuclear polymorphism and polyploidy, septal fibrosis, focal collagenization of sinusoid walls, and sinusoid endothelial proliferation and atypia were seen. No angiosarcomatous areas were found in laparotomies of the patients with noncirrhotic portal fibrosis after vinyl chloride exposure ranging between 9 mo and 21-3/4 yr. (50 references)

5193 MORPHOLOGICAL CHANGES OF THE LIVER AFTER CHRONIC VINYL CHLORIDE INTOXICATION. (Ger.) Mueller, R. (Pathologisches Institut der Universitaet, D-5300 Bonn-Venusberg, West Germany); Bechtelsheimer, H.; Gedigk, P.; Marsteller, H. J.; Lelbach, W. K. *Leber Magen Darm* 5(5): 204-208; 1975.

The liver histopathology of 50 workers exposed to vinyl chloride was examined from biopsy material. Three of the probands presented with polycentric hemangioendothelial sarcoma extending along the ectatic sinusoids into the parenchyma. In border areas a transition between proliferating atypical sinusoid cells and tumor cells was apparent, typical of the angiosarcomas reported after chronic arsenic and thorium dioxide exposure. Septal fibrosis of the portal fields and collagenization of sinusoid walls, chainlike proliferation of sinusoid endothelial cells with nuclear polymorphism, hepatocytic hyperplasia with nuclear polyploidy, and focal adaptation of the hepatocytic cytoplasm (with hyperplasia of the smooth endoplasmic reticulum) to hydropic swelling, fat vacuolization, and cell necrosis were signs of generalized hepatotoxicity. Hepatocytic hyperplasia was most pronounced in the areas of the reactive sinusoid endothelium and at tumor interfaces. (20 references)

5194 CLONORCHIASIS AND HEPATIC NEOPLASMS. (Eng.) Purtilo, D. T. (Dept. Pathology, Univ. Massachusetts Medical Sch., Worchester, MA). *Trop Georgr Med* 28(1): 21-27; 1976.

The clinical and pathological conditions of 38 patients from Hong Kong who had been chronically infested by *Clonorchis sinensis* were studied to delineate differences in the etiopathogenesis of hepatocellular carcinoma and cholangiocarcinoma. (The organism has been implicated in the etiology of the two cancers.) The 38 autopsied cases were investigated by use of the patient's clinical records and the gross and microscopic findings from autopsy. Ten died of hepatocellular carcinoma, seven of cholangiocarcinoma, and one each of carcinoma of the common bile duct and lymphoma. The major difference between the patients having cholangiocarcinoma and hepatocellular carcinoma was cirrhosis; only one patient with cholangiocarcinoma had cirrhosis, whereas all but one patient with hepatocellular carcinoma had cirrhosis. It is concluded that the etiopathogenesis of these two tumors is substantially different. (11 references)

5195 DOUBLE AND MULTIPLE CARCINOMAS OF THE COLON. (Ger.) Heystraten, F. M. J. (Institut fuer Roentgendiagnostik, Universitaet Geert Groot plein Z. 18, Nijmegen, Netherlands); Rosenbusch, G.; Schillings, P. H. M. *Fortschr Rontgenstr* 123(6): 548-552; 1975.

Double and multiple carcinomas of the colon are categorized into those occurring with and without predisposing disease. Carcinomas without predisposing disease are further subdivided into synchronous, metachronous, or combined types. Synchronous tumors are those arising either simultaneously or within 6 mo after discovery of the first carcinoma. They comprise 60%-80% of all double carcinomas of the colon, which corresponds to 2%-4.6% of all patients in this group. More women than men are affected, and the maximum incidence falls at 56 yr of age. The rectosigmoid area is most involved. Metachronic tumors are those arising more than 6 mo, usually 5-10 yr, after discovery of the first carcinoma. They comprise 15%-40% of all double colon carcinomas, or 1%-2.5% of all patients in this group. There is no age or sex bias. The later-appearing of the double tumors is more frequent in other segments than the rectosigmoid. Carcinomas with predisposing disease comprise 2%-5% of all colon malignancy. The predispositions include ulcerative colitis, polyposis coli, and adenomatous polyps. Persons with a total ulcerative colitis of 15-20 yr duration are at high risk. Adenomatous polyps in colonic polyposis tend toward malignant degeneration; approximately 50% of all colon resections for polyp removal reveal two or more carcinomas. Unlike hamartomatous polyps, pseudopolyps, or meta- and hyperplastic polyps, adenomatous polyps are a symptom of a colon predisposed to malignancy. These polyps occur in 40%-60% of synchronous carcinoma and in 60% of metachronous carcinoma of the colon.

5196 CARCINOMA OF THE SMALL BOWEL: A COMPLICATION OF REGIONAL ENTERITIS. (Eng.) Nesbit, R. R., Jr. (Medical Coll. Georgia, Augusta, GA 30902) Elbadawi, N. A.; Morton, J. H.; Cooper, R. A., Jr. *Cancer* 37(6): 2948-2959; 1976.

Two cases (the 35th and 36th) of adenocarcinoma associated with regional enteritis are reported. A 69-yr-old man with a 35 yr history of gastrointestinal symptoms was admitted to the hospital after multiple episodes of intestinal obstruction. At laparotomy, the proximal small bowel was dilated down to a firm area of stenosis in the proximal ileum. A frozen section was not diagnostic, but malignancy was suspected and a 30 cm segment of ileum was resected. Adenocarcinoma was diagnosed in the histologic sections. Six months later he again developed intestinal obstruction and was reexplored.

Extensive peritoneal carcinomatosis was present, and the patient died 21 days after an ileotransverse colostomy. A 65-yr-old man had had gastrointestinal symptoms for 45 yr, and regional enteritis was first diagnosed at age 58. He received some relief with cortisone. During a cholecystectomy the terminal ileum was noted to be inflamed. He did well until age 61 when he began to have diarrhea. Radiographic changes indicated progression of his disease. At elective laparotomy, an end-to-side ileotransverse colostomy was performed to bypass the diseased ileum. Over the next 2 yr he continued to have diarrhea and twice required blood transfusions. At age 65 he was admitted for evaluation of rectal bleeding. Barium enema revealed an apparent carcinoma in the bypassed bowel. At surgery, two apparent primary carcinomas were encountered, one in the ascending colon and one in the terminal ileum. At autopsy 8 wk later, extensive metastatic carcinoma was observed. The histopathology of the two tumors is described, and a brief review of the literature is presented. Of the 35 patients, 25 were male and 11 were female; the average age at diagnosis was 46 yr. The average age at onset of symptoms ranged from 10 to 56 yr, and the average duration of symptoms before diagnosis of carcinoma ranged from 1 wk to 47 yr. Surgery was undertaken in 35/36, for bowel obstruction in 25/32. Diagnosis was established postoperatively in 23. The involved site was duodenum in 1, jejunum in 9, and ileum in 23; 2 patients had two carcinomas. In 11 cases carcinoma arose in a previously bypassed bowel segment. In the followed cases, 21/28 died within 1 yr. (39 references)

5197 CARCINOMA OF THE LARGE INTESTINE IN YOUNG ADULTS. (Ger.) Roesch, W. (Medizinische Universitaetsklinik, BRD-852 Erlangen, Krankenhausstr. 12, West Germany). *Zentralbl Chir* 100(24): 1502-1504; 1975.

In a 5-yr survey of colon carcinoma in 455 patients, 31 were found under 40 yr of age, none of whom had histories of congenital polyposis, total ulcerative colitis, or Crohn's disease. In the over-40 age group, only 46% were amenable to resection, in contrast to 21/31 in the proband group. One patient was under 20 yr, 3 were between 21 and 25, 5 between 26 and 30, 12 between 31 and 35, and 10 between 36 and 40 yr. Abdominal pain was the most frequent symptom, followed by irregularities in intestinal motility, weight loss, and anemia. Tumor localization was in the rectosigmoid region in 55%-70% of the cases. Dedifferentiated carcinoma was most frequently found; no accompanying adenomatous polyps occurred. There were several recurrences 4-17 yr postintervention. One 39-yr-old patient, both of whose parents died relatively young from gastrointestinal carcinoma, presented with three inoperable colon carcinomas. (11 references)

5198 POLYPS AND CANCER OF THE LARGE BOWEL. (Eng.) Morson, B. (St. Mark's Hosp., Dept. Pathology, London, England). *West J Med* 125(2): 93-99; 1976.

The morphology of the adenoma-carcinoma sequence and the malignant potential of isolated adenomatous polyps and villous adenomas are discussed. In a series of 1,961 malignant tumors in patients seen over an 11-yr period, 14.2% showed evidence of contiguous benign tumor, either adenomatous polyp or villous adenomas. It is suggested that 50%-66% of all cancer of the colon and rectum arises from previously benign polyps or villous adenomas. There is a close relationship between the size of adenomas and their malignant potential. The malignant potential is very low for tumors under 1 cm in diameter. Between 1 and 2 cm in diameter, the malignancy rate increases to 10%, and nearly 50% of all polyps over 2 cm in diameter show evidence of invasive cancer. There is also a correlation between increasing epithelial atypia and increasing malignant potential. In a study of 3,002 patients, 19.7% had multiple synchronous tumors, either benign or malignant, and 7% developed a second benign or malignant tumor on follow-up examination. The interval between the first and second malignant tumor varies from 2 to 31 yr, with the average being 13.5 yr. The adenoma-carcinoma sequence averages 10-15 yr; however, it may be as short as 5 yr or cover a normal adult lifespan. Further data on the adenoma-carcinoma sequence are presented in a discussion of familial polyposis. It is recommended that patients who have had adenomas or cancers removed have regular follow-up examinations of the entire large intestine as a means of cancer prevention. (12 references)

5199 DIFFERENTIAL DIAGNOSIS AND SURGICAL TREATMENT OF CONGENITAL POLYPOSIS. (Ger.) Ulrich, B. (Chirurgische Universitaetsklinik Duesseldorf, D-4000 Duesseldorf, Moorenstr. 5, West Germany); Moschinski, D.; Becker, H. J.; Rumpf, P.; Jacobs, G. *Langenbecks Arch Chir* 340(2): 137-146; 1975.

The malignant tendency of intestinal polyps was explored in 18 patients, including 7 members of one family. The mother died of intestinal cancer at age 33; two brothers succumbed at ages 31 and 36, after rejecting surgical resection 8 yr earlier. A sister who was proctocolectomized survives symptom-free. Three of five children of the deceased mother were affected but could not be studied further. Seven of 15 offspring from other polyposis families also reported the stigma. Of the 18 patients examined, 8 reported at least one parental death from the condition. The average age at diagnosis was 39 yr; the disease is not sex-linked (nine of the patients were men and nine were women). Surgical intervention in the 18 cases found 7 adenocarcinomas and 2 noncancerous epithelial atypia. Congenital polyposis is an autosomal-dominant malady, often concomitant with other intestinal syndromes (for example, Gardner's) of which the diffuse adenomatous structure is markedly precancerous (unlike polyp formation following chronic mucosal irritation). (20 references)

5200 FAMILIAL 'MINOR' ADENOMATOUS POLYPOSIS COLI ASSOCIATED WITH GASTRIC CARCINOMA--A HITHERTO UNDESCRIBED PHENOTYPE OF POLYPOSIS COLI?

(Eng.) Ammann, R. W. (Div. Gastroenterology, Dept. Medicine, Kantonsspital, CH-8091 Zurich, Switzerland); Deyhle, P.; Sulser, H. *Scand J Gastroenterol* 11(3): 233-240; 1976.

A clinical study of a family with a high incidence of death from gastric cancer in the second generation is presented. Endoscopic and/or surgical evaluation of the stomach, upper small intestine, and colon in 14 mainly asymptomatic members of the third and fourth generations revealed single or multiple (solitary) papillary adenomas in the colon or jejunum in two members each of the two generations. In addition, single or multiple hyperplastic polyps in the stomach or colon were found in five members, four of which also had papillary adenomas. The findings are consistent with minor adenomatous polyposis coli associated with gastric carcinoma. Gastric carcinoma probably represents another phenotype among the vast variety of extracolonic and extra-alimentary neoplastic changes that occur in association with familial polyposis coli (FPC). A relationship of hyperplastic polyps to papillary adenoma in the colon and to gastric carcinoma, respectively, is suggested by the high incidence of the latter, which affected four of six siblings of the second generation. Finally, evidence for a genetic relationship between the family studied and a case with probable FPC is presented. (37 references)

5201 IMMUNOHISTOCHEMICAL STUDIES ON NORMAL AND PATHOLOGICAL GASTRIC MUCOSA. DETERMINATION OF EMBRYONIC AND SPECIFIC ANTIGENS. (Ger.) Falser, N. (Pathologisches Institut, Univ., A-6020 Innsbruck, Muellerstrasse 44, Austria); Lederer, B.; Schwamberger, K.; Reissigl, H. *Z Krebsforsch* 84(1): 19-24; 1975.

The immunohistochemical detection of various antigens in gastric carcinoma and adjacent tissues is reported. Imprint preparations were made directly from biopsy material drawn during resection for assorted gastric, duodenal, and intestinal neoplasia. In 9/10 gastric carcinomas acid α-glycoprotein and β-galactosidase were positive. AB blood group, gastrin, gastric mucosa, and α-fetoprotein antigens varied insignificantly with control levels. Values for the antigens matched against atypical tissue from areas surrounding the tumor sites at various radii were equivocal. Blood group-specific antigens were positive only in diffuse invasive carcinoma, not carcinoma in situ. (20 references)

5202 CANCER OF THE GREATER CURVATURE OF THE STOMACH. (Rus.) Portnoi, L M. (M. F. Vladimirskii Moscow Regional Clinical Science Res. Inst., Moscow, USSR); Rokhlin, E. A.; Zhuk, V. I.; Kaushanskaia, P. V.; Osadchii, P. A. *Sov Med* (7): 119-125; 1975.

The clinical signs of cancer of the greater curvature of the stomach and the possibilities of using roentgenography and fibrogastroscopy for its diagnosis were analyzed on the basis of 76 cases. This type of cancer was found in 8.9% of stomach tumors, more frequently than is commonly admitted in the literature. Clinical signs of tumors were atypical in many cases: the cancer was asymptomatic in 5 patients in the early and relatively late stages, and stomach discomfort was highly insignificant in 16 patients. The cancer was localized in the greater curvature in 11/151 cases and was widely diffused in the others. Ulcerated tumors were encountered in almost all cases. In four patients, the diagnosis of cancer was made with fibrogastroscopy; the presence of the tumor was not even established upon retrospective evaluation of the roentgenologic picture. In three cases, only roentgenologic study permitted a diagnosis. The diagnosis of tumors with such primary localization should be based upon the complex use of roentgenologic methods, primarily pneumogastrography and fibrogastroscopy accompanied by biopsy and cytologic examination.

5203 LATE PRECANCEROUS CHANGES AND CARCINOMA OF THE GASTRIC STUMP AFTER BILLROTH I RESECTION. (Eng.) Domelloef, L. (Dept. Surgery, Univ. Hosp., Univ. Umea, Umea, S-90187, Sweden); Eriksson, S.; Janunger, K. G. *Am J Surg* 132(1): 26-31; 1976.

Carcinoma of the gastric remnant after resection for benign ulcers is regarded as a rare complication after Billroth I resection. In 74 patients reexamine by gastroscopy and multiple biopsies 10-22 yr after gastric resection, four cases of cancer of the gastric stump were diagnosed and the patients operated on. Another eight patients had regenerative polyps and one patient had a tubular adenoma. The histologi findings in gastroscopic biopsy specimens from the gastric stoma and fundus are compared. Possible precancerous changes and etiologic aspects are discussed briefly. Findings support the hypothesis that the incidence of stump cancer is similar regardless of the anastomatic procedure of earlier ulcer operations, at least in geographical regions where the incidence of gastric carcinoma is high. Repeated gastroscopy is recommended starting about 10 yr after gastric resection for benign ulcers. (25 references)

5204 MENETRIER'S DISEASE--A PRECANCEROSIS? RESULTS OF A PROSPECTIVE STUDY. (Ger.) Roesch, W. (Medizinische Klinik mit Poliklinik, Universitaet Erlangen-Nuernberg, D-8520 Erlangen, Krankenhausstrasse 12, West Germany); Fuchs, H. F.; Kemmerer, G.; Hermanek, P. *Leber Magen Darm* 5(3): 85-89; 1975.

Three case histories of operable gastric carcinoma that originated during management of Menetrier's disease are presented. One patient with histologically and endoscopically confirmed gastric mucosa hypertrophy presented with a carcinoma of the stoma within 9 mo. The mass extended from the antrum to the cardia, with marked foveolar hyperplasia of the fundic mucosa. Regional lymph nodes along the first 2 cm of the duodenum were infiltrated with tumor cells. A second case presented with a large, poorly differentiated gastric adenocarcinoma extending to the serosa, with prominent foveolar hyperplasia and an intact mucous layer more than 1 mm thick, 1 yr after a confirmed diagnosis of Menetrier's disease. Surgical intervention in a third patient 2 yr after endoscopically confirmed giant hypertrophic mucosa found an undifferentiated small-celled carcinoma on the anterior and posterior walls of the body of the stomach growing over areas of foveolar hyperplasia. An uncomplicated carcinoma was also found on the transverse colon. The similarity of the histologic and endoscopic data, the constant juxtaposition of foveolar hyperplasia and carcinoma, and the multiple growth potential of gastric carcinoma rank a person with Menetrier's disease as a risk for gastric carcinoma.

5205 HISTOLOGICAL STUDY ON THE NUMERICAL CHANGE OF PLASMA CELLS IN REGIONAL LYMPH NODES OF THE CARCINOMATOUS STOMACH. (Eng.) Nakano, K. (Chiba Cancer Center, Chiba, Japan). *Acta Pathol Jpn* 26(1): 17-23; 1976.

A relationship between metastatic lesions and the degree of appearance of plasma cells in regional lymph nodes affected by carcinoma of the stomach was observed. At the initial stage of metastasis to a lymph node, numerous plasma cells were found in the lymphatic parenchyma adjacent to the metastatic lesion. The number was especially high in the medullary cord, where the malignant cells that failed to settle down began to degenerate. This phenomenon may be explained by an antigen-antibody reaction at the initial stage of metastasis in a lymph node.

5206 CEROID-LIKE HISTIOCYTIC GRANULOMA OF GALLBLADDER--A PREVIOUSLY UNDESCRIBED LESION. (Eng.) Takahashi, K. (Fukushima Medical Coll., Fukushima, Japan); Oka, K.; Hakozaki, H.; Kojima, M. *Acta Pathol Jpn* 26(1): 25-46; 1976.

Thirteen cases of a peculiar gallbladder granuloma characterized by marked proliferation of ceroid-filled brown histiocytes were examined pathomorphologically, histochemically, and ultrastructurally. Grossly, the lesions showed a granulomatous appearance of yellow-brown to dark brown color in the wall of gallbladder. Histologically, there was proliferation of histiocytes containing abundant brown pigment granules in the cytoplasm. The pigment granules had staining characteristics closely resembling those of lipogenic ceroidlike pigment. Ultrastructurally, these granules showed membrane-bound, pleomorphic osmiophilic inclusions of heterogenous materials. The pathogenesis suggests that lipid components of bile juice, particularly unsaturated fatty acids and phospholipids, play an important role as a source of ceroidogenesis in the proliferating histiocytes.

5207 TUMOR FREQUENCY IN AUTOPSY CASES. IV. THE MALIGNANT TUMORS OF THE KIDNEY. (Ger.) Ruediger, K.-D. (Medizinische Akademie, 50 Erfurt, Nordhaeuser Strasse 74, East Germany); Guethert, H.; Woeckel, W. *Zentralbl Allg Pathol* 119(6): 527-532; 1975.

A malignancy rate of 34%, or 7,533 persons, was established for a 15-yr period in a retrospective survey of 22,155 autopsy records (12,212 men and 9,943 women). Primary tumor sites were reported in 7,442 records (3,987 men, 3,455 women). Renal malignancy occurred in 186 cases, including 177 carcinomas and 9 sarcomas. The sex distribution was 126 men and 60 women, a statistically insignificant difference. There were renal tumors in 9 males and 7 females between 15 and 49 yr of age, in 86 males and 41 females between 50 and 69 yr, and in 31 males and 12 females between 70 and 99 yr. The percent of renal malignancy to all malignancies for males and females respectively, was 3.2 and 1.7. Nearly half of the renal tumors were associated with the group aged 60-69 yr; 70% occurred between 50 and 69 yr of age. Metastases were recorded in 162 cases. Lymph nodes, lung, bone, and liver were the most frequent sites. The contralateral kidney was involved in 25% of the cases. Renal cell carcinoma was confirmed histologically in 76% of the renal tumor population, with epithelial cell types involved in another 15%. The highest incidence of sarcoma was 3.3% and was of the spindle cell type.

5208 A NEW CASE OF RIOPELLE TUMOR. (Fre.) Lagache, G. (Clinique chirurgicale Adultes Est, CHU, 59000 Lille, France); Paris, J.; L'Hermine, C.; Houcke, M. *Chirurgie* 101(8): 597-604; 1975.

A case history of a 37-yr-old man with Riopelle's tumor, a rare type of renal tumor consisting of a true renal cell carcinoma, a sarcoma and an angiomyolipoma was presented. The exteriorization of the tumor in the left hypochondrium made it difficult to diagnose; successful removal of the tumor was followed by the patient's death 6 mo later with mediastinal, pelvic, and hepatic metastases. Although the embryogenesis of these tumors is complex and controversial, they appear to arise from a single cell strain of the renal blastema.

5209 MESOTHELIOMA IN SYRIAN HAMSTERS. V. MACROSCOPIC AND HISTOLOGIC INVESTIGATION OF TRANSPLANTED MESOTHELIOMAS IN SOLID AND ASCITIC FORMS. (Ger.) Arnold, W. (Zentralinstitut fuer Krebsforschung der Akademie der Wissenschaften der DDR, DDR-1115 Berlin-Buch, Lindenberger Weg 80, East Germany); Mehnert, W.-H.; Bender, E.; Graffi, A. *Arch Geschwulstforsch* 46(2): 94-104; 1976.

Three transplantable mesothelioma lines, one solid (sc) and two ascites (ip), and their sequelae in HaP Syrian hamsters are described. Hamsters of both sexes, aged 4-6 wk, and various litters aged 1-3 days were the target hosts. In precursor tests only 1/600 animals presented with a spontaneous mesothelioma. The time-to-tumor and the degree of tumor differentiation varied inversely with the number of in vivo passages, which became apparent by the fifth generation. Primary tumors or initial inocula showed little invasive tendency, a function of the degree of fibrous encapsulation. Subsequent passages of either the solid or ascites lines showed an increasing tendency toward infiltration with decreasing fibrous resistance, medullary growth, and anaplasia; there was a plethora of atypical mitoses. The fluid accumulation in the ascites lines gradually diminished with increasing generations, with little change in the formation of multiple nodular tumors in the liver, diaphragm, and intestinal loops, even after many passages. However, five ascites passages were required to attain the degree of tumor invasiveness typical of one solid line passage. (19 references)

5210 SURFACE TOPOGRAPHY OF LEUKOCYTES IN SITU: CELLS OF MOUSE PERITONEAL MILKY SPOTS. (Eng.) Orenstein, J. M. (Natl. Cancer Inst., Natl. Insts. Health, Bethesda, MD 20014); Shelton, E. *Exp Mol Pathol* 24(3): 415-423; 1976.

Identical peritoneal lymphocytes, macrophages, and mast cells fixed in situ on the surface of milky spots of the omentum and mesentery from 4-mo-old strain A female mice were identified in the light microscope and then studied in the scanning electron microscope. The surface of the lymphocytes ranged from highly villous to totally bald, and their shape varied from spherical to that of a ''hand-mirror.'' The macrophage surface was rugose, but it also had microvilli, and its shape ranged from discoid with a regular outline to flat with an irregular outline. The mast cell was usually discoid and had an undulating surface with few microvilli and the frequent impression of underlying granules. The microvilli of the lymphocytes and the ridges and folds of the macrophages had also characterized these cells in vitro following their removal from the peritoneal cavity and incubation on artificial substrates. However, there were pronounced differences in their appearances in situ and in vitro. In vitro the lymphocyte was very regular in shape and varied little in the number of its microvilli, while the macrophage had an uneven distribution of surface features and could even be totally smooth. The elongated processes that were frequently directly between neighboring cells in vitro occurred less frequently in situ, where there was more intimate contact between cells. Processes that appeared to be of a similar nature frequently joined substrate cells to the cells resting on their surfaces. (24 references)

5211 EXPERIMENTAL STUDIES ON THE EFFECT OF INDUCED ANTIFIBRINOLYSIS ON PRE-OPERATIVE TUMOUR CELL SHEDDING. (Eng.) Peterson, H.-I. (Dept. Surgery I, Sahlgrenska Sjukhuset, Univ. Goteborg, S 41345 Goteborg, Sweden); Risberg, B. *Z Krebsforsch* 86(2): 121-125; 1976.

The effect of antifibrinolysis, induced with tranexamic acid, on the preoperative intravascular release of cells from a 20-methylcholanthrene-induced rat sarcoma was studied. Tumor cell shedding was estimated by registration of the outgrowth of secondary tumors in animals transplanted im or iv with blood from the operatively treated tumor area. Induced antifibrinolysis did not influence the intravascular shedding of tumor cells. However, a significantly increased release of tumor cells was found during biopsies on large primary tumors compared to the same operative procedure on small tumors. (17 references)

5212 ULTRASTRUCTURAL FEATURES OF PRIMARY LIVER CELL CARCINOMA: RELATIONSHIP OF CYTOPLASMIC INCLUSIONS TO ALCOHOLIC HYALINE (Meeting Abstract). (Eng.) Luisa Cristina, M. (Faculty Medicine, Univ. Lisbon, Lisbon, Portugal); Baptista, A. *Digestion* 12(4/6): 297; 1975.

5213 DISSEMINATED PERITONEAL LEIOMYOMATOSIS. (Ger.) Bettendorf, U. (Pathologisches Institut, Staedt. Kliniken, D-6200 Wiesbaden 1, Schwalbacher Str. 62, West Germany); Stelter, U. *Arch Gynaekol* 220(2): 179-183; 1975.

5214 MUCINOUS TUMORS OF THE OVARY. 11. ULTRASTRUCTURAL FEATURES OF MUCINOUS CYSTADENOCARCINOMAS. (Eng.) Fenoglio, C. M. (Dept. Pathology, Coll. Physicians and Surgeons, Columbia Univ., New York, NY); Ferenczy, A.; Richart, R. M. *Am J Obstet Gynecol* 125(7): 990-999; 1976.

5215 UNUSUAL CLINICAL MANIFESTATION OF A GYNANDROBLASTOMA. (Fre.) Hoang-Ngoc, M. (Service central d'Anatomie pathologique, Centre Hospitalier Regional, B.P. 364, 80030 Amiens Cedex, France); Douvin, D.; Gallot, P.; Huguet, C.; Smadja, A. *Rev Fr Gynecol* 71(1): 49-52; 1976.

5216 NON-FUNCTIONAL FAMILIAL ADENOMAS AND THEIR RELATION TO POLYENDOCRINE ADENOMATOSIS. (Fre.) Arnould, G. (Clinique Neurologique, Hopital Saint-Julien, 1, rue Foller, 54 Nancy, France); Montaut, J.; Leclere, J.; Lamaze, R.; Salmon, D. *Oto-Neuro-Opht* 47(3): 173-178; 1975.

5217 ULTRASTRUCTURE OF WARTHIN'S TUMOR (Meeting Abstract). (Eng.) Hokano, M. (Tokyo Medical Coll., Japan); Sassa, H.; Hikino, M. *Nihon Rynsho Denshi Kenbikyo Gakkai-Shi* 6(3/4): 413; 1973.

5218 THOROTRAST-INDUCED BILATERAL PAROTID TUMOR. ONE CASE. (Fre.) Piquet, J. J. (Centre Hospitalier Regional, Service O.R.L., Place Verdun, 59000 Lille, France); Pilliaert, J. M.; Decroix, G. *J Fr Otorhinolaryngol* 24(7): 538-540; 1975.

5219 MORPHOLOGICAL AND BIOCHEMICAL STUDIES ON THE SPINDLE CELLS IN PLEOMORPHIC ADENOMA OF THE SALIVARY GLAND. (Jpn.) Takeuchi, J. (Dept. Pathology, Sch. Medicine, Fujita-Gakuin Univ., Japan) Sobue, M.; Yoshida, M.; Esaki, T.; Katoh, Y.; Usizim H. *Jpn J Cancer Clin* 22(1): 32-38; 1976.

5220 RADIATION-INDUCED SALIVARY GLAND TUMORS: REPORT OF A CASE. (Eng.) Smith, S. A. (Dept. Pathology, Univ. Louisville Sch. Medicine, Health Sciences Center, Louisville, KY 40202). *Arch Otolaryngol* 102(9): 561-562; 1976.

5221 MENINGEAL SARCOMA AFTER IRRADIATION OF AN EPENDYMOMA (Meeting Abstract). (Eng.) Bojsen-Moller, M. (Depts. Neuropathology and Neurosurgery, Univ. Hosp., Aarhus, Denmark); Knudsen, V. *Acta Neurochir (Wein)* 33(3/4): 334; 1976.

5222 CHONDROSARCOMA WITH DEDIFFERENTIATED FOCI -- A COMPARATIVE AND ULTRASTRUCTURAL STUDY (Meeting Abstract). (Eng.) Kahn, L. B. (Dept. Pathology, Univ. Cape Town, South Africa). *S Afr Med J* 50(26): 1022; 1976.

5223 OSTEOSARCOMA (OS): 5 YEAR FOLLOWUP OF EPIDEMIOLOGY AND TUMOR SPECIFIC TRANSFER FACTOR THERAPY (TSTF) (Meeting Abstract). (Eng.) Levin, A. (Dept. Dermatology, Univ. California, Oakland, CA); Byers, V.; LeCam, L.; Hackett, A.; Johnston, J. *Clin Res* 24(3): 378A; 1976.

5224 THE SIGNIFICANCE OF DOUBLING TIME VALUES IN PATIENTS WITH PULMONARY METASTASES OF OSTEOGENIC SARCOMA. (Eng.) Plesnicar, S. (Inst. Oncology and Faculty Medicine, Vrazov trg 4, 61000 Ljubljana, Yugoslavia); Klanjscek, G.; Modic, S.; Habic, M. *Cancer Lett (Amsterdam)* 1(6): 351-358; 1976.

5225 STUDIES ON HUMAN BRONCHUS MAINTAINED IN CULTURE (Meeting Abstract). (Eng.) Trump, B. F. (Univ. Maryland Sch. Medicine, Baltimore, MD); Barrett, L. A.; McDowell, E. M.; Sato, T.; Van Haaften, C.; Harris, C. C. *J Cell Biol* 67(2/Part 2): 434a; 1975.

5226 ABNORMAL CILIA IN HUMAN BRONCHIAL EPITHELIUM. (Eng.) McDowell, E. M. (Dept. Pathology, Univ. Maryland Sch. Medicine, 31 S. Greene St., Baltimore, MD 21201); Barrett, L. A.; Harris, C. C.; Trump, B. F. *Arch Pathol Lab Med* 100(8): 429-436; 1976.

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5231 FIBROUS POLYPS OF THE URETER. (Eng.) Davides, K. C. (McKeesport Hosp., McKeesport, PA); King, L. M. *J Urol* 115(6): 651-653; 1976.

5232 POSSIBLE LINEAR ORDER OF GENES FOR ENDOCRINE NEOPLASIA TYPE 2, THE P RED CELL ANTIGEN AND HL-A ON CHROMOSOME 6. (Eng.) Jackson, C. H. (No affiliation given); Conneally, P. M.; Sizemore, G. W.; Tashjian, A. H. *Birth Defects* 12(1): 159-164; 1976.

5233 LATE MUCOSAL CHANGES AND MALIGNANT DEGENERATION AFTER PARTIAL GASTRECTOMY FOR PEPTIC ULCER (Meeting Abstract). (Eng.) Hakkiluoto, A. (Second Dept. Surgery and Central Lab. Pathology, Univ. Helsinki, Helsinki, Finland); Sipponen, P.; Kalima, T.; Kivilaakso, E. *Scand J Gastroenterol [Suppl]*. 10(Suppl. 34): 11-12; 1975.

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5236 BILHARZIASIS OF URINARY BLADDER AND URETER: COMPARATIVE HISTOPATHOLOGIC STUDY. (Eng.) Zahran, M. M. (Dept. Urology, Cairo Univ., Cairo, Egypt); Kamel, M.; Mooro, H.; Issa, A. *Urology* 8(1): 73-79; 1976.

5237 ACUTE ERYTHREMIC MYELOSIS OCCURRING EIGHT YEARS AFTER RENAL ALLOGRAFT. (Eng.) Sweeney, W. T. (Dept. Oral Pathology, Box 637, Medical Coll. Virginia, Virginia Commonwealth Univ., Richmond 23298); Madge, G. E.; Pierce, J. C. *South Med J* 69(7): 949-950; 1976.

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5240 A CASE OF NEURILEMMOMA ARISING FROM INTRATHORACIC VAGAL NERVE. (Jpn.) Shirakusa, T. (2nd Dept. Surgery, Faculty Medicine, Kyushu Univ., Japan); Yoshida, T.; Miyazaki, N.; Shigematsu, N.; Ishimaru, S. *Jpn J Thorac Surg* 28(1)): 827-830; 1975.

5241 HISTOPATHOLOGY OF RETINOBLASTOMA. (Spa.) Cordero Moreno, R. (Hospital Universitario de Carcacas, Caracas, Venezuela); Sanchez S. N. *Arch Soc Esp Oftal* 35(7): 739-746; 1975.

5242 RETINOBLASTOMA IN AN ADULT. (Ger.) Kremlicka, L. (Augenklinik ILF, Cs-18081 Prague 8-Bulovka, Budinova 2, Czechoslovakia); Roubkova, H. *Klin Monatsbl Augenheilkd* 167(1) 119-123; 1975.

5243 HEREDITARY RETINOBLASTOMA: PENETRANCE, EXPRESSIVITY AND AGE OF ONSET. (Eng.) Matsunaga, E. (Dept. Human Genetics, Natl. Inst. Genetics, 411 Mishima, Shizuoka-Ken, Japan). *Hum Genet* 33(1): 1-15; 1976.

5244 ATRIAL MYXOMA IN A FAMILY. (Eng.) Siltanen, P. (Cardiovascular Lab., First Medical Dept., Univ. Central Hosp., Meilahti, 00290 Helsinki 29, Finland); Tuuteri, L.; Norio, R.; Tala, P.; Ahrenberg, P.; Halonen, P. I. *Am J Cardiol* 38(2): 252-256; 1976.

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5246 CARDIAC RHABDOMYOMA: A CLINICOPATHOLOGIC AND ELECTRON MICROSCOPIC STUDY. (Eng.) Fenoglio, J. J. (Dept. Cardiovascular Pathology, Armed Forces Inst. Pathology, Washington, DC 20306); McAllister, H. A.; Ferrans, V. J. *Am J Cardiol* 38(2) 241-251; 1976.

5247 CARCINOMA OF THE CARDIA WITHIN A HIATUS HERNIA (Meeting Abstract). (Eng.) Thorbjar narson, B. (New York Hosp., New York, NY). *Scand J Gastroenterol* [Suppl.] 10(Suppl. 34): 10; 1975.

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5250 FINE STRUCTURE OF CAROTID BODY TUMOR (Mee ing Abstract). (Eng.) Sano, M. (Univ. Niigata Sch. Medicine, Niigata City, Japan); Soga, J.; Tazawa, K.; Sakashita, A.; Kohro, T.; Maruta, Y.; Muto, T. *Nihon Rynsho Denshi Kenbikyo Gakkai-Sh* 6(3/4): 398; 1973.

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5253 PLATELET GRANULOPATHY. A NEW MORPHOLOGIC FEATURE IN PRELEUKEMIC AND MYELOMONOCYTIC LEUKEMIA: LIGHT MICROSCOPY AND ULTRASTRUCTURAL MORPHOLOGY AND CYTOCHEMISTRY. (Eng.) Maldonadd, J. E. (Mayo Clinic, Rochester, MN). *Mayo Clin Proc* 51(7): 452-462; 1976.

5254 CHRONIC MYELOGENOUS LEUKEMIA STUDIED BY CELL CULTURE METHODS (Meeting Abstract). (Eng.) Senn, J. S. (Sunnybrook Medical Centre, Toronto, Canada); Price, G. B. *Clin Res* 23(5): 628; 1975.

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5256 ULTRASTRUCTURAL HISTOCHEMICAL ALTERATION OF THE PLASMALEMMA IN CHRONIC MYELOCYTIC LEUKEMIA (Meeting Abstract). (Eng.) Ackerman, G. A. (Dept. Anatomy, Ohio State Univ., Columbus, OH). *J Cell Biol* 67(2/Part 2): 2a; 1975.

5257 ULTRASTRUCTURAL IDENTIFICATION OF LEUKEMIC CELL COLONIES IN HUMAN BONE MARROW CULTURE (Meeting Abstract). (Eng.) Ahearn, M. J. (Univ. Texas System Cancer Center M. D. Anderson Hosp., Houston, TX); Trujillo, J. M.; Dicke, K. A. *J Cell Biol* 67(2/Part 2): 4a; 1975.

5258 ULTRASTRUCTURAL DEMONSTRATION OF ACID MUCOSUBSTANCE IN NORMAL AND LEUKEMIC MONOCYTIC AND NEUTROPHILIC LEUKOCYTES (Meeting Abstract). (Eng.) Parmley, R. T. (Medical Univ. South Carolina, Charleston, SC); Spicer, S. S.; Wright, N. J. *J Cell Biol* 67(2/Part 2): 325a; 1975.

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5260 SURFACE MORPHOLOGY OF LYMPHOCYTES AS SEEN WITH THE SCANNING ELECTRON MICROSCOPE (Meeting Abstract). (Eng.) de Harven, E. (Sloan-Kettering Inst. Cancer Res., New York, NY 10021); Lampen, N.; Calman, F.; August, M.; Pla, D. *J Cell Biol* 70(2/Part 2): 259a; 1976.

5261 ALTERED PLASMA MEMBRANE PROPERTIES IN LYMPHOMA (Meeting Abstract). (Eng.) Presant, C. A. (Jewish Hosp., Washington Univ. Sch. Medicine, St. Louis, MO 63130); Parker, S. *Clin Res* 24(4): 541A; 1976.

5262 ELECTRON MICROSCOPY IN THE MORPHOLOGICAL CLASSIFICATION OF HAEMATOLOGICAL MALIGNANCIES (Meeting Abstract). (Eng.) Toma, V. A. (Dept. Haematology, Univ. Orange Free State, Bloemfontein, South Africa); Du P. Heyns, A. *S Afr Med J* 50(26): 1011; 1976.

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5264 CELL SURFACE MORPHOLOGY OF THE STRAIN SPECIFIC TA3-ST COMPARED TO NON-STRAIN SPECIFIC TA3-HA ASCITES ADENOCARCINOMA CELL (Meeting Abstract). (Eng.) Miller, S. C. (Dept. Anatomy, Harvard Medical Sch., Boston, MA 02115); Hay, E. D.; Codington, J. F. *J Cell Biol* 70(2/Part 2): 144a; 1976.

5265 TUMORIGENIC AND METASTATIC POTENTIALS OF FRACTIONATED SOLID TUMOUR CELLS (Meeting Abstract). (Eng.) Finlay-Jones, J. J. (Dept. Microbiology, Univ. Western Australia, Perth Medical Centre, Shenton Park, Western Australia 6008); Sheridan, J. W. *Clin Exp Pharmacol Physiol* 3(3): 275-276; 1976.

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See also:

* (Rev): 4844, 4845, 4846, 4847, 4848, 4849, 4850, 4852, 4853, 4855, 4867, 4871, 4873, 4874, 4875, 4876, 4877
* (Chem): 4893, 4894, 4898, 4900, 4913, 4919, 4920, 4923, 4926, 4955, 4956
* (Phys): 4962, 4968, 4971, 4976, 4983
* (Viral): 5021, 5043, 5046, 5062, 5071, 5072
* (Immun): 5096, 5128, 5142
* (Epid-Biom): 5269, 5272, 5278, 5279, 5281, 5290, 5291, 5302, 5303, 5306, 5309, 5311, 5312, 5313, 5317, 5323

5267 EPIDEMIOLOGY OF GASTRIC CANCER. (Ger.)

Herold, H.-J. (Zentralinstitut fuer Geschwulststatistik, 1197 Berlin, Sterndamm 13, East Germany); Staneczek, W. *Dtsch Gesundheitswes* 31(8): 344-352; 1976.

A 20-yr epidemiological survey of gastric carcinoma (GC) morbidity and mortality in East Germany is compared with global and regional statistics. Since 1953, 150,000 new GC patients were reported in a total of more than a million new cancer cases. Between 1962 and 1967-8 the GC mortality curve lay above that for morbidity, but since 1968 the reverse is true; this applies to both sexes. Regional differences are slight and not readily explained, but cities tend to have higher rates than rural areas. The cities with the highest rates were usually those most afflicted by nutritional problems in the two wars. The urban region with the lowest rate also reports a very high rate of alcohol consumption. The average age of onset rose in 1962-72 from 67 to 69 yr for men and from 66 to 70 yr for women. An expected decrease in morbidity between present ages 35-40 is slight in men and absent in women, attributed to wartime nutritional deficit and stress. Adenocarcinoma was more frequent (74%) in men and undifferentiated carcinoma was highest (25%) in women. The antrum of the stomach was most affected (33%) in both sexes, with corpus involvement following at 20%. The risk groups included subjects with stomach resections, chronic atrophic gastritis, and polyps. (17 references)

5268 COLON CANCER: AN EPIDEMIOLOGICAL SURVEY.

(Eng.) Kassira, E.; (Dept. Epidemiology and Environmental Health, George Washington Univ. Medical Center, Washington, DC); Parent, L.; Vahouny, G. *Am J Dig Dis* 21(3): 205-214; 1976.

Available data on colon cancer were analyzed to assess the potential role of nutritional components in the primary etiology of colorectal cancer. Very high colonic cancer mortality (13-25/100,000) is characteristic of European, North American, and Australian populations; moderate rates (5-12/100,000) are found in Eastern Europe, Israel, and the Iberian peninsula, while very low rates (0.2-0.4/100,000) are reported for a number of Asian, Central American, and South American countries. Acculturation and/or duration of residence in the United States can be correlated with a rise in susceptibility to colonic cancer. Various assumptions on the etiology of colonic cancer can be made on the basis of epidemiologic evidence: colonic cancer is mediated by environmental factors, increased predisposition to colonic cancer may be associated with economically developed or industrialized countries, and some aspects of Western society (habits, customs, stress) contribute directly or indirectly to the high risk of colonic cancer. Most researchers currently investigating the association of dietary factors with intestinal carcinogenesis emphasize one or more food items: animal fat, animal protein, cholesterol, and dietary fiber. All of these substances have been related in some degree with alterations in intestinal microflora and/or bile salt metabolism; bacterial content may be an important factor in colonic cancer development. It appears that dietary factors play an important role in colonic cancer etiology. (35 references)

5269 EPIDEMIOLOGY OF CANCER OF THE COLON, DIVERTICULOSIS AND ULCERATIVE COLITIS. (Ger.)

Berndt, H. (Zentralinstitut fuer Krebsforschung Akademie der Wissenschaften der DDR, DDR-1115 Berlin-Buch, Lindenberger Weg 80, East Germany). *Zentralbl Chir* 101(7): 402-404; 1976.

The geographical morbidity and mortality of colon carcinoma, diverticulosis, and ulcerative colitis are surveyed. The higher incidence of colon carcinoma in industrial and urban regions, the global increase in morbidity and mortality, and the higher vulnerability of upper socioeconomic classes are cited. There is a strong epidemiological correlation between colon and mammary carcinoma and between colon and rectal carcinoma mortality that is thought to implicate exogenous, including nutritional, factors. A causal hypothesis is preferred: a high consumption of fat elicits elevations in bile salts, which can be degraded to polycyclic aromatic hydrocarbons by a nonpathogenic intestinal flora. Since there is less intestinal motility in high fat diets, the contact between hydrocarbon and intestinal mucosa is longer and the risk of carcinogenesis greater than in lower fat diets. Diverticulosis is also a disease of industrial countries, with a geographical distribution similar to those of colon carcinoma and coronary artery disease. The highest incidence is in Britain and is attributed to a low fiber diet, incomplete filling of the lumen, and reduced intestinal motility This elicits increased pressure and contractions and terminates in pulsion diverticula, with oncogenic implications. Ulcerative colitis is also associated with higher standards of living in more industrial societies and among the socioeconomically advantaged. Its relation to intestinal carcinoma remains unexplored. (No references)

5270 CERVICAL CARCINOMA IN FREDERIKSBERG BOROUGH THE INFLUENCE OF POPULATION SCREENING ON INCIDENCE AND STAGE DISTRIBUTION OF INVASIVE CASES.

(Eng.) Gad, C. (Frederiksberg Hosp., Gynaecological Dept., 2000 Copenhagen F, Denmark). *Dan Med Bull* 23(2): 86-95; 1976.

The occurrence of severe dysplasia (103 cases), carcinoma in situ (272 cases), and invasive cervical carcinoma (631 cases) in the borough of Frederiksberg, Copenhagen, Denmark from 1951 to 1972 is reported. The female adult population declined by 13% to 45,543 from 1950 to 1972; the younger ages were greatly reduced in number and there was a considerable increase in the number of older women. In the cytological screenings, 208 cases of cervical carcinoma were detected, of which 57 were invasive, all in stage I. The participation in the screening was 85%. After separation according to age, an improved stage distribution was demonstrated. Further, an effect was shown on the age-specific incidence of invasive carcinoma expressed as the average number of cases per year per 100,000 women, in both early and advanced cases. There was a more favorable stage distribution in the screened population compared to the unscreened one. Women who do not take part in screening may constitute a high-risk group. After correction for this possible source of error, there is a clear fall in the incidence of invasive cancer in screened women. Because only younger women were screened and because the precancerous stage is often lengthy, a long observation period is required after screening before the final effect can be evaluated. (29 references)

5271 EPIDEMIOLOGY OF CARCINOMA OF THE UTERINE CERVIX IN PREGNANCY. (Eng.) Kreiblich, H. (Frauenklinik des Bezirkskrankenhauses "Heinrich Braun," DDR-95 Zwickau, Karl-Keil-Str. 35, East Germany). *Zentralbl Gynaekol* 98(13): 809-814; 1976.

The relative frequencies of preinvasive and invasive cervical carcinoma in a parturient population during a 6-yr period are reported. The total population was 22,450 women between 13 and 48 yr of age, of which 4,785 sought interruption, 1,641 had aborted, and 16,024 were full-term. Positive Pap smears were found in 109 (88 with IV, 21 with V); Pap III occurred in 542, and 21,799 were negative (I and II). Colposcopies were performed in the first or second trimester. Unmodified mucosa was seen in 30% of the females up to 15 yr of age, 39% up to 20 yr, 13% at 25 yr, and 4.5% at 30 yr; 2,374 patients were in this group. Ectopic mucosa was seen in 50% of the group up to 15 yr, 31% at 20 yr, 35% between 25 and 30 yr, and 6.5% at 45 yr; 4,948 cases comprised this group. In the 13,666 women with typical transitional changes, 20% of those 15 yr or younger were unexpectedly positive; this group increased up to 78% by age 45. Atypical changes were found in 1,452 women, including none up to 15 yr of age, 5% at 20 yr, 6% at 25 and 30 yr, 7% at 35 yr, and 8% at 45 yr. There were only 10 cases of frank cervical carcinoma. Biopsies were made in 628 suspected cases of the 22,450 pregnancies. Of these, 343 were negative, 174 were slightly to moderately dysplastic, 57 had severe dysplasia, 42 presented with carcinoma in situ, and 12 had frank invasive carcinoma. The frequency of preinvasive or invasive cervical carcinoma is the same in parous and nulliparous women during the childbearing years. There was no evidence of a transition from severe dysplasia or preinvasive cancer to invasive carcinoma during pregnancy. (18 references)

5272 CARCINOMA OF THE GENITAL TRACT IN PREGNANCY. (Ger.) Estel, C. (Universitaets-Frauenklinik, DDR-69 Jena, Bachstr. 18, East Germany); Stech, D. *Zentralbl Gynaekol* 98(7): 429-432; 1976.

A review of the maternal tumor rate among pregnancies managed by a university obstetrical clinic from 1946 to 1974 is presented. The data were selected to include the gestation time and 6 mo postpartum or postabortum. There were 130 malignant tumors, including 119 cervical carcinomas, 2 carcinomas of the vulva, 2 vaginal carcinomas, 2 ovarian carcinomas, 3 teratomas, 7 choriocarcinomas, and 1 dysgerminoma. All the maternal malignancies constituted 0.28% of all pregnancies. Of the cervical carcinomas, 40 were treated during gestation (34 in stage I, 6 in stage II) and 73 were treated up to 6 mo postpartum (44 in stage I, 17 in stage II, 11 in stage III, and 1 in stage IV). The incidence of cervical carcinoma during gestation was 0.08%, which doubled to 0.16% postpartum or postabortum. The doubling is attributed to metabolic or hormonal alteration and increased lymphatic activity. (9 references)

5273 SOME EPIDEMIOLOGICAL FACTORS OF THE FEMALE GENITALIA CANCER INCIDENCE IN AZERBAIJAN SSR. (Rus.) Bakhshalieva, F. G. (Res. Inst. Roentgeno-Radiology and Oncology, Ministry Health Azerbaijan SSR, Baku, USSR). *Vopr Onkol* 21(10): 89-92; 1975.

The regional distribution of morbidity of female genital cancer in the Azerbaijan Republic was investigated for 1957-1966, and groups at risk were isolated for prophylaxis. Cervical cancer was predominant (86.6%). Compared to the mean yearly incidence of 12 cases of female genital cancer per 100,000 population, cervical cancer was observed in 46.4 cases per 100,000 among the Russian female population of the Republic, but in only 7.1 among the native population. Among 2,488 patients with cervical cancer, cervical ruptures were seen in 12.5% of cases, advanced erosions in 8.0%, and polyps in 4.0%. The percentage of multiparas was higher among women with malignant diseases of the genitalia than among healthy women, 52.5% of the first group and only 34.5% of the second group having delivered four or more times.

5274 RAUWOLFIA DERIVATIVES AND BREAST CANCER IN HYPERTENSIVE WOMEN. (Eng.) Armstrong, B. (Dept. Medicine, Univ. Western Australia, Perth, Australia); Skegg, D.; White, G.; Doll, R. *Lancet* 2(7975): 8-12; 1976.

Three groups were selected from a sample of death certificates of women who died in England and Wales over a 2-yr period: those who had a history of breast cancer and hypertension; those with a history of hypertension and other cancers; and a group who had hypertension without cancer, selected to match the breast cancer patients with respect to four features. When the women with breast cancer were compared with the women with other cancers and the women without cancer, there was a positive association between breast cancer and the use of rauwolfia derivatives, although neither the differences in the frequency nor duration were statistically significant. The association appeared to be strongest for use near the time of diagnosis of the cancer. This agrees with nearly all other data and would be expected if rauwolfia derivatives promoted the development of breast cancer from previously initiated cells. (13 references)

5275 AGE INCIDENCE AND SITE DISTRIBUTION OF MAMMARY DYSPLASIAS IN YOUNG BEAGLE BITCHES. (Eng.) Warner, M. R. (Cell Biology Dept., Baylor Coll. Medicine, Houston, TX 77030). *J Natl Cancer Inst* 57(1): 57-61; 1976.

The age incidence and site distribution of 2,142 mammary dysplasias were documented for 39 beagle bitches 6 mo to 4 yr of age. Lesion onset was at 2-3 yr of age, at which time over 50% of the females had dysplasias. Dysplasias appeared before palpable tumors. Posterior mammae developed more lesions than did anterior mammae. Thus the gradient for early onset of lesions coincided with the gradient for tumor frequency reported previously; a preneoplastic potential is suggested for (some) dysplasias. (30 references)

5276 SPONTANEOUS TUMORS AND COMMON DISEASES IN TWO COLONIES OF SYRIAN HAMSTERS. III. UROGENITAL SYSTEM AND ENDOCRINE GLANDS. (Eng.) Pour, P. (Eppley Inst. for Res. in Cancer and Allied Diseases, Univ. Nebraska Medical Center, 42d St. and Dewey Ave., Omaha, NB 68105); Mohr, U.; Althoff, J.; Cardesa, A.; Kmoch, N. *J Natl Cancer Inst* 56(5): 949-961; 1976.

The frequency of spontaneously occurring neoplasms in the urogenital system and endocrine organs was examined in the Eppley colony (EC) and Hannover colony (HC) of Syrian hamsters. With the exception of a renal adenoma in an EC female, the urinary systems of animals in both colonies were free of neoplastic growths. A single epididymal adenoma of the male genital system (EC) was found. However, incidences of female genital tract tumors were 10% (EC) and 3.5% (HC) and accounted for 34% and 11%, respectively, of all tumors in females. Among all genital tract tumors, 3% (EC) and 57% (HC) were ovarian, 14% (HC) were in the fallopian tubes, 81% (EC) and 29% (HC) were uterine, and 16% (EC), vaginal. The overall incidence of endocrine organ tumors was similar in both colonies (EC, 22%; HC, 19%). The distribution of these tumors was as follows: pituitary gland: EC, 3%, HC, 0; thyroid gland: EC, 28%, HC, 31%; parathyroid gland: EC, 11%, HC, 18%; adrenal cortex: EC, 42%, HC, 31%; adrenal medulla: EC, 7%, HC, 0; and endocrine pancreas: EC, 10%, HC, 31%. Both the incidence and morphology are in accordance with findings reported in other colonies. (28 references)

5277 SPONTANEOUS TUMORS AND COMMON DISEASES IN TWO COLONIES OF SYRIAN HAMSTERS. IV. VASCULAR AND LYMPHATIC SYSTEMS AND LESIONS OF OTHER SITES. (Eng.) Pour, P. (Eppley Inst. for Res. in Cancer and Allied Diseases, Univ. Nebraska Medical Center, 42d St. and Dewey Ave., Omaha, NB 68105); Mohr, U.; Althoff, J.; Cardesa, A.; Kmoch, N. *J Natl Cancer Inst* 56(5): 963-974; 1976.

Spontaneous tumors of the hematopoietic and lymphatic systems have been reported in many hamster colonies. Lesions of organs and tissues not previously reported are discussed, and elucidation of a comparative morphologic study of these neoplasms is attempted. Spontaneous tumors were found in the vascular and lymphatic systems upon systemic histologic examination of the cardiovascular, hematopoietic, and lymphatic tissues of Syrian hamsters from the Eppley (EC) and Hannover colonies (HC). The endothelial tumor incidence (hemangioendotheliomas) was similar in both colonies and sexes. The hemangio endotheliomas generally originated in the liver and spleen. Malignant lymphomas developed in high incidences in both colonies; however, their morphology varied. Those in EC hamsters were histiocytic and, to a lesser extent, plasmacytic types; in the HC, lymphocytic and epitheloid cell types were also found. Among tumors of miscellaneous sites, Harderia gland adenomas occurred in almost equal frequencies in EC and HC hamsters, predominately in males. Bone and soft tissue tumors were present only in EC hamsters, whereas skin neoplasms developed solely in H hamsters. The wide variation in frequency, endemic development, contagiousness, and occasional association with infectious diseases of spontaneous malignant lymphomas may indicate an infectious agent as their cause. (53 references)

5278 PRIMARY CANCER AND TUBERCULOSIS OF THE LUNGS. (Rus.) Rabukhin, A. E. (Central Inst. Postgraduate Training of Physicians, Moscow, USSR); Upiter, M. Z. *Klin Med (Mosk)* 53(12): 63-68; 1975.

Epidemiologic interrelationships between primary pulmonary cancer and tuberculosis of the lungs were investigated in 300 patients suffering from both diseases. Clinical and diagnostic material concerni 139 patients with primary bronchiogenic cancer and tubercular changes of the lungs was studied. Primar pulmonary cancer was encountered more frequently in individuals with tuberculosis than among the popula tion at large, with men over age 40 constituting th major group at risk. Cancer with and without tubercular pulmonary changes appeared with approximatel the same frequency as peripheral (49.7%) and centra (50.3%) cancer and primarily in older age groups an among males. In 75.4% of cases, tuberculosis preceded the development of cancer, usually by 5-10 yr or more. Examination of material on the clinical manifestations of primary cancer and tuberculosis showed that different clinical symptoms and shifts in laboratory indices encountered in tuberculosis and in lung cancer characterized the majority of patients. In most cases, however, clinical and roen genologic symptomatology of the pulmonary process was interpreted incorrectly prior to patient admission for treatment. The best results in cancer dete tion were obtained by bronchoscopy combined with biopsy, mainly for the central form (70.2%); catheterization of the peripheral bronchi with aspirati biopsy, mainly for the peripheral form (80%); and other bioptic methods (55.1%).

5279 BRONCHIAL CARCINOIDS. (Ger.) Roenspies, (Centre Hospitalier Universitaire Vaudoi (CHUV), Service de Chirurgie A, CH-1011 Lausanne, Switzerland); Pfenninger, E.; Otto, R.; Senning, A *Thoraxchirurgie* 24(3): 154-163; 1976.

A 16-yr survey (1959-1974) of 40 resected bronchia adenomas is reported. Carcinoids were diagnosed in 35 cases and adenoid-cystic carcinoma in 5. Mucoep dermoid carcinoma was not found. (During the same interval, 30 benign and 1,690 malignant lung or bronchial tumors were also diagnosed.) Of the 35 frank carcinoid cases, 20 were female; the average age for both sexes was 48.4 yr (range, 17-71 yr); 17 had right and 18 had left localizations. Each was accompanied by some form of chronic obstructive bronchial involvement, mainly bronchopneumonia, atelectasis, and hemoptysis. The duration of symptoms ranged from 2 wk to 19 yr; five were asymptomatic. (One patient was inoperable because of the presence also of esophageal carcinoma.) Intervention was chiefly by lobectomy or bilobectomy, bronchotomy with excision, or pneumonectomy; five patients suffered recurrences. Invasive growth occurred in 14 cases, and 3 were metastatic to the regional nodes. There were no remote metastases. No patient presented with a carcinoid syndrome or exceptional endocrine function. Nicotine habituation can be excluded as a cause because of the approximately equal sex ratio. The literature reports a higher incidence in non-Caucasian men for all types except bronchial and appendiceal carcinoids, suggesting organ specificity or ethnic linkages. (9 references)

5280 SMOKING, CHRONIC AIRWAY DISEASE AND LUNG CANCER. (Ger.) Beil, M. (Medizinische Klinik, Silikose-Forschungs-Institut, 463 Bochum, Hunscheidtstrasse 12, West Germany). *Prax Pneumol* 29(7): 403-412; 1975.

The pulmonary response of active and passive smokers is reviewed. Both chronic nonspecific bronchial disease and bronchial carcinoma have increased, according to all epidemiological surveys. Acute and chronic effects of short-term (or moderate) and long-term exposure to tobacco smoke are detailed morphometrically and mechanistically. Overwhelming evidence of pulmonary obstruction, bronchoconstriction, and goblet cell hyperplasia with hypersecretion is linked to tobacco inhalation. Bronchial carcinoma is nine times more frequent in cigarette smokers than nonsmokers for men and continually increasing for women, after a 20- or 30-yr latency. In ostensibly noninhaling smokers of cigars and pipes, the carcinoma frequency is twice that of nonsmokers. The results after tobacco dishabituation depend on the duration and degree of prior smoking habits. Thirty-year smokers can achieve a risk level compatible with that of nonsmokers after a 10-yr abstinence. (No references)

5281 CANCER OF THE LOWER ALVEOLUS. (Eng.) Cooke, R. R. (Government Cancer Inst., Rosmead Place 106/1, Colombo 7, Sri Lanka). *Gann Monogr Cancer Res* (18): 37-46; 1976.

The high incidence (10%) of cancer of the lower alveolus among oropharyngeal cancers, which constitute 47% of all cancer cases of patients admitted to the Cancer Institute, is thought to result from the backward flow of saliva in the floor of the mouth to the pharynx, which produces a concentration of saliva on both sides of the molars. The high incidence among people who chew tobacco mixed with slaked lime and areca nut wrapped in betel leaf suggests the presence of a carcinogen in this mixture. People who begin to chew at age 10-14 yr frequently develop cancerous changes in the oral mucosa by age 30-40 yr. Among 418 untreated cases in 1972, the most common site was the cheek (46%), followed by the lower alveolus (19%). Nearly 83% of the oral cancers arose in relation to the buccal grooves on either side of the alveolus and its boundaries. Surgical resection and reconstructive surgery are discussed. In inoperable cases, radiotherapy and ia cytotoxic therapy have a role. (1 reference)

5282 A POPULATION-BASED STUDY OF BLADDER CANCER. (Eng.) Cole. P. *In: Host Environment Interactions in the Etiology of Cancer in Man. Proceedings of a Meeting Held at Primosten, Yugoslavia, 27 August-2 September 1972.* International Agency for Res. on Cancer (Lyon, France): pp. 83-87, 1973.

The proportion of bladder cancer cases in a representative population that could be attributed to smoking and occupation was assessed, and other possible hazards were considered. A case-control study was made of a total incidence series of lower urinary tract cancers (92% had bladder tumors). Controls were age- and sex-matched and otherwise randomly selected; 470 cases and 500 controls were interviewed. The population attributable risk percent (AR%) was calculated for the variables of smoking, hazardous occupation, and coffee drinking. (The AR% is that proportion of the disease that is caused by a specific exposure, assuming a causal relationship). With respect to bladder cancer and smoking, the AR% for men was 35%. An estimate is not given for women because bladder cancer is characteristically a disease of advanced age and women did not take up cigarette smoking to any appreciable extent until 1920. The number of female smokers is increasing, however, and, undoubtedly, so will the AR%. The occupational AR% is estimated to be 18% among men, but the figure varies between populations, reflecting differing occupational experiences. However, even among men in industrialized societies, probably not more than 25% of the disease can be attributed to occupational exposures. With respect to coffee drinking, it remains to be determined whether a consistent association exists with risk of disease; then detailed analyses of the AR% will be warranted. (14 references)

5283 URINARY TRACT CARCINOMAS IN GAS INDUSTRY EMPLOYEES. (Ger.) Manz, A. (Werksarztliche Dienststelle, Hamburger Gas- und Wasserwerke, D-2000 Hamburg 1, Monckebergstr. 8, West Germany). *Munch Med Wochenschr* 118(3): 65-68; 1976.

An epidemiological study of mortality in an urban gas and waterworks facility is presented. Approximately 6,000 persons, including 800 females, were involved. Neoplasms were found in 261 males and 25 females. There were 13 primary urinary tract tumors, including 12 in the bladder and 1 in the renal pelvis. These rates are compatible with the cancer statistics of the general population. However, mortality related to certain occupational duties was significantly higher. Urinary tract carcinoma occurred more often in workers exposed to tars or tar-containing vapors. The mean exposure time was 21 yr, latency (time between last exposure and death) 10.4 yr, and age at death 66 yr. The contribution of smoking was equivocal. Urinary tract polyps were frequent. No worker not so exposed was affected. Prophylaxis against aromatic amines is reviewed. (22 references)

5284 HEPATIC ANGIOSARCOMA IN WORKERS FOLLOWING CHRONIC EXPOSURE TO VINYL CHLORIDE. EPIDEMIOLOGY AND RESEARCH PROGRAM IN WORKERS.

(Fre.) Makk, L. (St. Anthony Hosp., Louisville, KY); Delorme, F.; Creech, J. L. *Union Med Can* 104(12): 1833-1835; 1975.

Several cases of hepatic angiosarcoma were found in two factories (one in Louisville, Kentucky, and one in Quebec, Canada), involved in the production of polyvinyl chloride from vinyl chloride. As a result, a survey was made of all 1183 employees of the Kentucky plant to detect other cases of angiosarcoma and to find early signs of benign liver damage. Three new cases were found in three men, aged 36-58, who had been exposed to the compounds for a period ranging from 4 yr to 27 yr, 10 mo. They survived from 2 to 22 mo after the appearance of the first symptoms. Although no test is specific for angiosarcoma of the liver, abnormalities in tests for hepatic function may be directly proportional to the extent of the lesions.

5285 THIRTY-TWO CASES OF MESOTHELIOMA IN VICTORIA, AUSTRALIA: A RETROSPECTIVE SURVEY RELATED TO OCCUPATIONAL ASBESTOS EXPOSURE.

(Eng.) Milne, J. H. (Industrial Hygiene Div., State Health Dept., 5 Parliament Place, Melbourne 3002, Victoria, Australia). *Br J Ind Med* 33(2): 115-122; 1976.

Of 32 cases of mesothelioma that occurred during an 11-yr period in Victoria, Australia, 29 were pleural and 3 peritoneal. There were 22 autopsies. End occupations were misleading in 66% of cases. Two of the three subjects with peritoneal mesothelioma were siblings, and there was no evidence of occupational or other exposure to asbestos in either. There was a significant prevalence of pulmonary asbestos bodies in the tumor series compared with an unselected consecutive series of 200 routine autopsies. The occupational history was as effective a method of assessing true asbestos exposure as the pulmonary asbestos body count. Five cases had had a duration of exposure of 1 yr or less, but they had had heavy exposure. The latent interval before tumor development was 25 yr or longer in each case. There was no known exposure to asbestos in five cases (16%). The rare association of mesothelioma with types of asbestos other than crocidolite may not exist, as shown by the proportion (16%) of the tumors arising randomly in the population. (16 references)

5286 A PROPORTIONAL STUDY OF CANCER REGISTRATIONS OF DOCKYARD WORKERS.

(Eng.) Lumley, K. P. S. (Medical Res. Unit, H.M. Naval Base, Devonport, Plymouth, Devon, England). *Br J Ind Med* 33(2): 108-114; 1976.

Evidence of an occupational effect due to asbestos exposure was sought by comparing cancer registrations for dockyard workers with those for all men matched for age and living in the same area (Plymout England) during a 9-yr period (1960-69). The results show a significant excess of pleural tumors in the dockyard group but no significant excess at other sites. Registrations for pleural mesothelioma were recorded for men with many dockyard occupations, and the observed mean interval between first exposure to asbestos and registration for a pleural tumor (37.6 yr) indicates that cases of pleural mesothelioma may be expected to occur among these workers for many years, even though crocidolite is no longer used in naval ships. A trend of increasing annual excess of stomach and gastrointestinal registrations was observed in the dockyard group. No cases of peritoneal mesothelioma were recorded, but it is likely that some did occur that were diagnosed as cancers arisin from other sites. This may account for some of the excess of gastrointestinal registrations. (25 references)

5287 COMPARISON OF THE CONTENT OF 14 POLYCYCLIC AROMATIC HYDROCARBONS IN SEDIMENTED DUST AND SUSPENDED AIR PARTICLES COLLECTED ALONG THE BITUMEN AND CONCRETE COATED STRETCHES OF HIGHWAYS BETWEEN LAUSANNE AND GENEVA.

(Fre.) Neukomm, S. (Institut universitaire de medicine sociale et preventive, Route de la Clochatte, CH-1052 Le Mont s/Lausanne, Switzerland); Vu Duc, T.; Barblan, C. *Soz Praeventivmed* 20(2): 65-68; 1975.

Dust samples were taken from three places along the Champ du Grand Chene, Switzerland: in the open air along a concrete section of the road; in the open air along a bitumen coated stretch; and in the confined air of a tunnel along a bitumen coated stretc Air samples were also taken at a height of 1.5 m along a highly trafficked section of the road. The samples were analyzed for anthracene, phenanthrene, fluoranthene, pyrene, chrysene, benzo(a)anthracene, benzo(e)pyrene, benzo(a)fluoranthene, perylene, benzo(ghi)perylene, anthanthrene, dibenzo(a,h)anthracene, and coronene. The levels of the hydrocarbons in the dust along the bitumin and concrete sections were nearly identical, but the levels in the tunnel were approximately twice as high as the others. The levels found in the dust in the air wer about 10-20 times above those found in the dust along the ground, possibly due to the finer nature of the particles and greater surface area. It is concluded that automobile exhaust is the source of polycyclic aromatic hydrocarbon pollution along thi roadway.

5288 ANALYSIS OF CANCER MORTALITY FROM 1950 TO 1968 IN LARGE PREDOMINANTLY CHEMICAL INDU TRIAL PLANTS WITH RESPECT TO INDUSTRIAL EXPOSURE.

(Ger.) Horbach, L. (Institut fuer Medizinische Statistik und Dokumentation, Universitaet Erlangen-Nuernberg, 8520 Erlangen, Waldstrasse 6, West Germany); Koller, S.; Loskant, H. *Zentralbl Arbeitsmed* 25(8): 225-241; 1975.

A comprehensive retrospective survey of cancer mortality in 10 large industrial facilities during 1950-1968 is discussed. Three chemical plants, a pharmaceutical house, a large automobile factory, three rubber plants, and two petroleum refineries were canvassed. Detailed data from questionnaires, medical reports, etc., about exposures, work habits, and type of cancer were matched with exhaustive classifications of chemical compounds. Mortality for the period included 4,445 men. The incidence of oropharyngeal carcinoma was higher and that of esophageal and gastric cancer lower than in the general population. Colon and rectal carcinomas, especially in nonexposed groups, were much higher than expected. Despite vinyl chloride exposure in the sample population, the occurrence of portal and biliary cancer was less than expected. Pancreatic tumors were also elevated. Striking increases in both urinary tract and respiratory cancer were established; bronchopulmonary involvement was especially high in workers exposed to both organic and inorganic chemicals. Skin cancer was slightly higher than expected. The incidences of cancer of the bone, connective tissue, endocrine glands, and prostate were similar to general population rates. (17 references)

5289 METHODOLOGIES OF RISK ASSESSMENT. (Eng.)

Newill, V. A. (Medical Dept., Linden, NJ 07036). *Ann NY Acad Sci* 271: 413-417; 1976.

Methodologies of risk assessment in industrial populations and the problems encountered are discussed. The incidence rate is the best probability statement that the epidemiologist can derive, as it gives the probability that a person at risk will become a case or an event. Prospective studies carry a high probability of producing significant data, but the validity of the results depends on the success of the follow-up procedures for the exposed and nonexposed groups. Case history studies differ from prospective studies in that the sampling frame is out of the disease category rather than from the exposure category. These studies are easier to perform and are less expensive, but they yield less reliable results. The lack of routine and uniform medical records and the lack of adequate occupational categories are the most common problems associated with any sort of investigation. Associations or inferences found in studies using hospital or industrial records are often spurious and should be regarded with caution. Prospective studies generally produce more valid information. However, epidemiological studies need replication and consistency of results over these replications to confirm any associations.

5290 EVALUATION OF HISTOLOGICAL TYPING OF HODGKIN'S DISEASE AFTER TWO YEARS OF EXPERIENCE.

Eng.) Bosman, C.; Cori, G. C.; Gallo, P. *In: Current Studies on Standardization Problems in Clinical Pathology, Haematology, and Radiotherapy in Hodgkin's Disease. Proceedings of the Third International Symposium of the Comitato Italiano per la Standardizzazione dei Metodi Ematologici e di Laboratorio (CISMEL), San Giovanni Rotondo, Italy, 12-14 September 1974.* (Amsterdam: Excerpta Medica): pp. 197-204; 1975.

A statistical analysis of the observed cases of Hodgkin's disease (HD) in Rome from 1972 to 1974 was presented and compared to other series classified according to the scheme of Lukes and Butler. Of the cases observed, only 125 proved positive for HD (70 men and 55 women, 4 to 81 yr old). Histologically, mixed cellularity type was found in 37.6% of the cases, nodular sclerosis in 31.2%, lymphocyte depletion in 16.8%, and lymphocyte predominance in 8%; 6.4% were unclassifiable. In this and other series, a slight preponderance of nodular sclerosis was seen among the females, but all other histological types were more common in males (except for lymphocytic predominance, which, in one series, was 40% higher in females). The mean age of 36.1 yr found in this series was in agreement with other results. The mean age for each histological type according to sex is illustrated. The most frequent histological type in a single location was mixed cellularity in the cervical lymph nodes. Coexistence of different histological types was observed where there were contemporary multiple localizations. As in other series, mixed cellularity patterns developed into lymphocytic depletion patterns. In a limited number of observations there was also a development from the nodular sclerosis type to mixed cellularity or lymphocytic depletion. This last possibility would appear to conflict with Luke's opinion that two independent forms of HD cannot interfere with each other during their evolution. (7 references)

5291 KINETIC STUDIES ON NORMAL AND LEUKEMIC CELL PRODUCTION IN ACUTE LEUKEMIA. (Eng.)

Fliedner, T. M. (Abteilung fuer Klinische Physiologie, Universitaet Ulm, 79 Ulm, West Germany); Hoelzer, D.; Koebele, K.; Steinbach, K. H. *Adv Biosci* 14: 361-376; 1975.

Injections of ^{3}H-labeled thymidine (12 courses, 0.1 μCi/g body wt) were used to study the pattern of blood granulocytes in 10 patients (2 with erythroleukemia, 2 with plasma cell leukemia, 1 with acute myelomonocytic leukemia, and 5 with acute myelocyte leukemia) with different forms of acute leukemia. Two of the patients with acute myelocyte leukemia were studied both before treatment and at first relapse after a complete remission with chemotherapy. The influx rate (fraction of granulocytes replaced by labeled cells per day) in all 10 patients was significantly lower than that in patients with normal-hematopoiesis or bacterial infection. Values ranged from 3%-20%/day compared with a normal value of 44%/day and a value of 50%/day for severe infection. In all cases showing a markedly reduced fraction of granulocytic precursor cells per 100 nucleated bone marrow cells, the relative influx rate was reduced to less than half of normal. There also appeared to be some positive correlation between granulocyte concentration in the blood of untreated patients and the labeled granulocyte blood influx rates. Thus, the blood granulocyte concentration in acute leukemic patients appears to be strongly related to the degree of perturbance of the granulocytopoiesis. At least two populations of granulocytes that cannot be distinguished by ordinary light microscopy are proposed for acute myelocytic leukemia: one population may undergo a series of sequential doubling divisions resulting in a normal number of granulocytes per myeloblast division or per stem-cell division, whereas a second population of granulocytes may exist that originates from precursors unable to go through a normal sequence of catenated cell divisions. These precursors skip divisions at various levels of maturation, and at least some mature to become granulocytes capable of being discharged into the blood. (23 references)

5292 ''DIALECT GROUP'' VARIATIONS IN CANCER INCIDENCE AMONG CHINESE IN SINGAPORE. (Eng.) Shanmugaratnam, K.; Wee, A. *In: Host Environment Interactions in the Etiology of Cancer in Man.* Doll, R.; Vodopija, I., eds. World Health Organization, Internatl. Agency for Res. on Cancer. (Lyon, France): pp. 67-82; 1973.

5293 CANCER IN UTAH -- RISK BY RELIGION AND PLACE OF RESIDENCE (Meeting Abstract). (Eng.) Lyon, J. L. (Dept. Family and Community Medicine, Univ. Utah, Salt Lake City, UT 84132); Klauber, M. R.; Gardner, J. W.; Smart, C. R. *Am J Epidemiol* 104(3): 343; 1976.

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5295 'SOCIOECONOMIC STATUS' AND REFERRAL BIAS IN CANCER MORTALITY (Meeting Abstract). (Eng.) Wells, C. K. (Yale Univ., New Haven, CT 06520); Feinstein, A. R. *Clin Res* 24(3): 250A; 1976.

5296 RACE, SOCIO-ECONOMIC STATUS, AND PROSTATIC CANCER (Meeting Abstract). (Eng.) Ernster, V. L. (Univ. California, Berkeley, CA 94720); Selvin, S.; Winkelstein, W.; Brown, S. M.; Sacks, S. T.; Austin, D. F.; Bertolli, T. A.; Mandel, S. A. *Am J Epidemiol* 104(3): 341; 1976.

5297 RACIAL DIFFERENCES IN THE CHANGING INCIDENCE OF CHILDHOOD LEUKEMIA (Meeting Abstract). (Eng.) Szklo, M. (Johns Hopkins Univ. Sch. Hygiene and Public Health, Baltimore, MD 21205); Gordis, L.; Kaplan, E.; Tonascia, J. A. *Am J Epidemiol* 104(3): 330-331; 1976.

5298 THE FACE OF LEUKEMIA IN INDIA (Meeting Abstract). (Eng.) Robinson, W. A. (All India Inst. Medical Sciences, New Delhi, India); Mangalik, A. *Clin Res* 24(3): 318A; 1976.

5299 ABNORMAL LYMPHOCYTE RESPONSES IN RESIDENTS OF A TOWN WITH A CLUSTER OF HODGKIN'S DISEASE (Meeting Abstract). (Eng.) Plouffe, J. (Dept. Medicine, Univ. Michigan, Ann Arbor, MI 48104); Callen, J.; Schwartz, R.; Allen, J.; Silva, J. *Clin Res* 24(3): 249A; 1976.

5300 EPIDEMIOLOGY OF HODGKIN'S DISEASE: A REPOR OF A CLUSTER (Meeting Abstract). (Eng.) Schwartz, R. (Dept. Internal Medicine, Univ. Michigan, Ann Arbor, MI 48104); Callen, J.; Silva, J. *Clin Res* 24(3): 249A; 1976.

5301 ACQUAINTANCE NETWORKS AMONG LEUKEMIA AND LYMPHOMA PATIENTS (Meeting Abstract). (Eng.) Greenwald, P. (New York State Dept. Health, Buffalo, NY); Rose, J. S.; Daitch, P. B.; Hunt, R. G.; Dayton, P. W. *Am J Epidemiol* 102(5): 452-453; 1975.

5302 AN INTERPRETIVE REVIEW OF LYMPHOMA OF THE STOMACH. (Eng.) Hertzer, N. R. (Dept. General Surgery, Cleveland Clinic Foundation, Cleveland, OH); Hoerr, S. O. *Surg Gynecol Obstet* 143(1): 113-124; 1976.

5303 CARCINOMA OF THE GASTRIC STUMP AFTER OPERATION FOR BENIGN GASTRADUODENAL ULCER. (Eng.) Terjesen, T. (Dept. Surgery, Regionsykehuset, Trondheim, Norway); Erichsen, H. G. *Acta Chir Scand* 142(3): 256-260; 1976.

5304 PRIMARY LIVER CANCER IN THE UNITED STATES (Meeting Abstract). (Eng.) Mason, T. J. (NCI, Bethesda, MD 20014); Fraumeni, J. F. *Am J Epidemiol* 104(3): 313-314; 1976.

5305 THE CHANGING INCIDENCE OF ASSOCIATIONS OF HEPATITIS B AND LIVER-CELL CARCINOMA IN CALIFORNIA (Meeting Abstract). (Eng.) Peters, R. L. (Dept. Pathology, Univ. Southern California Sch. Medicine, Los Angeles, CA 90047); Afroudakis, A. P. Tatter, D. *Am J Clin Pathol* 66(2): 462; 1976.

5306 A CASE-CONTROL STUDY OF PANCREATIC CARCINOMA IN OKLAHOMA CITY HOSPITALS, 1970-1975 (Meeting Abstract). (Eng.) Howson, C. P. (Coll. Health, Oklahoma City, OK 73190); Asal, N. R. *Am J Epidemiol* 104(3): 333; 1976.

5307 BLADDER CANCER SURVIVAL: A COMPARISON BY ECONOMIC STATUS (Meeting Abstract). (Eng.) Ross, R. K. (Dept. Preventive Medicine and Environmental Health, Univ. Iowa, Iowa City, IA 52240). *Clin Res* 24(4): 595A; 1976.

5308 FAILURE OF STATISTICAL PREDICTIONS OF COLON CANCER RECURRENCE (Meeting Abstract). (Eng.) Evans, J. T. (Roswell Park Memorial Inst., Buffalo, NY); Cedermark, B.; Mittelman, A.; Bivins, B. A.; Somes, G.; Meeker, W. R. *Clin Res* 24(4): 548; 1976.

5309 PAPILLARY AND FOLLICULAR CARCINOMA OF THE THYROID: GEOMEDICAL VARIATIONS IN SCANDINAVIA AND CLINICAL STRATEGY. (Eng.) Heimann, P. (Dept. Surgery, Univ. Bergen, 5016 Haukeland Sykehus, Bergen, Norway). *Bull Soc Int Chir* 34(5): 429-432; 1975.

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5311 CONTEMPORARY ASPECTS OF THYROID CARCINOMA. (Eng.) Sedgwick, C. E. (Dept. Surgery, Lahey Clinic Foundation, Boston, MA); Cady, B.; Bookwalter, J. R.; Meissner, W. A. *Bull Soc Int Chir* 34(5): 421-427; 1975.

5312 A UNIQUELY COLLECTED SET OF FAMILY HISTORIES FOR THE STUDY OF INCIDENCE AND ASSOCIATIONS OF CANCER (Meeting Abstract). (Eng.) Child, M. A. (Michigan Cancer Foundation, Detroit, MI 48201); Albert, S. *Am J Epidemiol* 104(3): 342-343; 1976.

5313 FAMILIAL ASSOCIATIONS BETWEEN BIRTH DEFECTS AND CANCER (Meeting Abstract). (Eng.) Janerich, D. T. (New York State Dept. Health, Albany, NY 12237). *Am J Epidemiol* 102(5): 456-457; 1975.

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5316 DEATH FROM ISCHAEMIC HEART-DISEASE AND MALIGNANCY IN ADULT PATIENTS WITH COELIAC DISEASE. (Eng.) Whorwell, P. J. (Southampton General Hosp., Tremona Road, Southampton SO9 4XY, England); Alderson, M. R.; Foster, K. J.; Wright, R. *Lancet* 2(7977); 113-114; 1976.

5317 EPIDEMIOLOGIC FACTORS AS RELATED TO SPECIFIC NEOPLASMS IN ATAXIA-TELANGIECTASIA FAMILIES (Meeting Abstract). (Eng.) Daly, M. B. (Univ. North Carolina Sch. Medicine, Chapel Hill, NC 27514). *Am J Epidemiol* 104(3): 331-332; 1976.

5318 DISCREPANCIES IN THE REPORTED INCIDENCE OF PRIMARY NEOPLASMS OF THE NERVOUS SYSTEM: INTERNATIONAL COMPARISONS (Meeting Abstract). (Eng.) Schoenberg, B. S. (NIH, Bethesda, MD 20014); Christine, B. W.; Whisnant, J. P. *Am J Epidemiol* 104(3): 332; 1976.

5319 TRENDS IN CANCER INCIDENCE AND MORTALITY IN THE USA. (Eng.) Culter, S. J. (Biometry Branch NCI, NIH, Bethesda, MD); Devesa, S. S. *In: Host Environment Interactions in the Etiology of Cancer in Man.* World Health Organization, Internatl. Agency for Res. on Cancer. (Lyon, France): pp. 15-34; 1973.

5320 CORRELATIONS BETWEEN CANCERS IN THE UNITED STATES (Meeting Abstract). (Eng.) Winkelstein, W. (Univ. California, Berkeley, CA 94720); Sacks, S. T.; Ernster, V. L.; Selvin, S. *Am J Epidemiol* 104(3): 332-333; 1976.

5321 STUDIES OF THE ETIOLOGY AND EPIZOOTIOLOGY OF LYMPHOSARCOMA IN NORTHERN PIKE (*ESOX LUCIUS*) AND MUSKELLUNGE (*ESOX MASQUINONGY*). (Eng.) Sonstegard, R. (Dept. Microbiology, Univ. Guelph, Guelph, Ontario N1G 2W1, Canada). *Bibl Haematol (Basel)* (43): 242-244; 1976.

5322 COMPARATIVE EPIDEMIOLOGICAL ASPECTS OF NATURALLY OCCURRING MALIGNANT LYMPHOMA IN DOMESTIC CATS AND RHESUS MONKEYS. (Eng.) Schneider, R. (Animal Neoplasm Registry, Dept. Epidemiology and Preventive Medicine, Sch. Veterinary Medicine, Univ. California, Davis, CA 95616). *Bibl Haematol (Basel)* (43): 227-231; 1976.

5323 FELINE INTESTINAL ADENOCARCINOMA: A CLINICOPATHOLOGIC STUDY OF 22 CASES. (Eng.) Patnaik, A. K. (Dept. Pathology, Animal Medical Center, 510 East 62nd St., New York, NY 10021); Liu, S.-K.; Johnson, G. F. *Vet Pathol* 13(1): 1-10; 1976.

5324 BILE DUCT CARCINOMA IN DOGS. (Eng.) Strafuss, A. C. (Manhattan, KS 66506). *JAVMA* 169(4): 429; 1976.

5325 SEBACEOUS GLAND CARCINOMA IN DOGS. (Eng.) Strafuss, A. C. (Dept. Pathology, Kansas Agricultural Experiment Station, Coll. Veterinary Medicine, Kansas State Univ., Manhattan, KS 66506). *J Am Vet Med Assoc* 169(3): 325-326; 1976.

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5327 PAROTID GLAND TUMORS, OBSERVED IN RESEARCH INSTITUTE FOR NUCLEAR MEDICINE AND BIOLOGY, HIROSHIMA UNIVERSITY. (Jpn.) Takeichi, N. (Dept. Cancer Res., Res. Inst. for Nuclear Medicine and Biology, Hiroshima Univ., Hiroshima, Japan); Hirose, F.; Inoue, S.; Niimoto, M.; Hattori, T. *Jpn J Cancer Clin* 22(4): 307-311; 1976.

5328 THE ORIGIN AND THE AMOUNT OF ^{90}SR FALLOUT IN TOKYO IN RECENT YEARS (Meeting Abstract). (Eng.) Miyake, Y. (Geochemistry Res. Assoc., Tokyo, Japan); Katsuragi, Y. *J Radiat Res (Tokyo)* 15(1): 43; 1974.

5329 METEOROLOGICAL STUDY ON THE REGIONAL CHANG IN THE RADIOACTIVE FALLOUT (Meeting Abstract). (Eng.) Miyake, Y. (Geochemistry Res. Assoc. Tokyo, Japan); Saruhashi, K.; Kanazawa, T. *J Radiat Res (Tokyo)* 15(1): 43; 1974.

5330 OCCUPATIONAL MORTALITY IN AN AREA OF LOW CANCER INCIDENCE (Meeting Abstract). (Eng Smith, T. J. (Dept. Family and Community Medicine, Univ. Utah, Salt Lake City, UT 84132); Lyon, J. L.; Leymaster, C. E. *Am J Epidemiol* 104(3): 314; 1976.

5331 SELENIUM AND CANCER: A REVIEW. (Eng.) Schrauzer, G. N. (Univ. California at San Diego, Revelle Coll., La Jolla, CA 92093). *Bioinorg Chem* 5(3): 275-281; 1976.

See also:

* (Rev): 4811, 4812, 4813, 4822, 4836, 4837, 4838, 4839, 4840, 4841, 4842, 4843, 4844, 4851, 4852, 4860, 4875, 4876, 4877, 4878
* (Chem): 4930, 4948, 4953, 4955
* (Phys): 4957, 4981, 4986
* (Viral): 5000, 5061, 5075
* (Path): 5158, 5177, 5192, 5193, 5195, 5197 5200, 5207, 5223, 5233, 5238

332 TISSUE CULTURE OF HUMAN ADULT ADENOIDS AND OF MIDDLE EAR MUCOSA. (Eng.) Drucker, I. NT Dept., Meir Hosp., Kfar Saba, Israel); Weisman, ; Sade, J. *Ann Otol Rhinol Laryngol* 85(3): 327- 3; 1976.

e purpose of this study was to develop a model of stembryonic human respiratory mucosae, in vitro, om human adenoids and from middle ear mucosa in der to gain some understanding of the processes of fferentiation, hypersection, and metaplastic anges. Explants from adenoids and middle ear mucosa re cultured, both as organ cultures and monolayers, r periods of up to 2 wk, and their developmental aracteristics were studied and described. Over 50% the explants showed mitosis, epithelial and mono- yer growth, ciliary activity, and differentiation to ciliated and into mucus-producing cells. Adenoid plants were grown in air without and with added 5% $_2$. Under the latter conditions, the proportion of plants and monolayers showing ciliary activity was % greater. It is concluded that this model might suitable for further studies of the factors that ntrol cytodifferentiation in mucociliary epithelia. 9 references)

33 THE USE OF IMMUNOCHEMICAL METHODS FOR THE CHARACTERIZATION AND PURIFICATION OF TISSUE- ECIFIC MITOTIC INHIBITORS (CHALONES). (Rus.) Okulov, B. (Lab. Experimental Tumors, Res. Inst. Oncology, nistry Public Health USSR, Leningrad, USSR); Ket- nskii, S. A. *Tsitologiia* 17(11): 1294-1299; 1975.

munologic methods were used to analyze the pro- in content of rat skin ethanol extract and to ify chalones from nonepidermal proteins. On the sis of acrylamide gel disk electrophoresis, the ethanol-precipitable fraction of water-soluble oteins from skin inhibiting the proliferation of idermal tissues contained at least nine protein mponents. Seven were imunochemically identical to nologous serum proteins and could be adsorbed on corresponding immunosorbents. Only two proteins fered in antigenic properties from rat serum oteins and remained in the solution following munoadsorption. Their electrophoretic properties re the same as those in the total 81% ethanol ctions, and, like those fractions, they could ibit the entrance of cells into mitosis and the synthesis phase. The findings indicate that the munologic method is the most acceptable for the aration and purification of G_1- and G_2-inhibitors.

4 BIOCHEMICAL METHOD FOR THE ASSESSMENT OF THE DEGREE OF MALIGNANCY OF TRANSPLANTABLE PATOMAS. (Rus.) Gobeev, V. N. (Scientific Res. st. for Biological Testing Chemical Compounds, raia Kupavna, Moscow District, USSR); Berezov, T. *Dokl Akad Nauk SSSR* 227(3): 750-751; 1976.

energy balance in hepatomas 49, 48, 60, and 22a uced in C3HA mice was determined quantitatively related to neoplastic pathogenesis. The length the latent period (time from transplantation to obvious tumor growth) was selected as the quantitative biological characteristic of malignancy. The proposed approach confirms Warburg's hypothesis that malignancy is based upon a decrease in cell respiration in tumors, a compensatory increase in glycolysis intensity, and the destruction of the interrelationship between glycolysis and respiration, leading to aerobic glycolysis in cells. The method appears to allow precise estimation of the degree of malignancy according to several biochemical parameters.

5355 SIZE OF PRIMARY TRANSCRIPTS IN EHRLICH ASCITES CELLS AS MEASURED BY TETRAPHOSPHATE DETERMINATION. (Eng.) Schmincke, C. D. (Max-Planck-Institut fuer Virusforschung, Abteilung fuer Zellbiologie, 74 Tuebingen 1, West Germany); Herrmann, K.; Hausen, P. *Proc Natl Acad Sci USA* 73(6): 1994-1998; 1976.

A method for the quantitation of 5'-tetraphosphate ends in ^{32}P-labeled RNA was developed. The tetraphosphate content of different RNA fractions obtained from Ehrlich ascites cells labeled with ^{32}P for different lengths of time was determined. Molecules bearing the poly (A) sequence at the 3' end, representing completed RNA chains, were selected; the content of nucleoside 5'-triphosphate-3'(2')-monophosphate (pppNp), representing the 5' terminus of the primary transcript, was determined and related to the total number of nucleotides. An average molecular wt was calculated and compared to independent size determinations in denaturing gels. Ribosomal RNA and poly(U)-binding RNA (mRNA), labeled for long periods, lacked 5'-terminal tetraphosphate. From the amount of the tetraphosphate, molecular wt data were calculated for these RNA fractions that agreed with independent determinations by denaturing gel electrophoresis. The results demonstrated that the majority of the poly(A)-containing hnRNA molecules were small (< 28 S) and contained the tetraphosphate of the primary transcript. Therefore, they did not originate from the 3' end of large molecules by processing events. Alternative interpretations of the data are suggested: (a) the poly(U)-Sepharose column may select only a certain fraction of the poly(A)-containing hnRNA; (b) the primary transcript may split into smaller pieces and poly(A) may be added to the 3' end of the split; and (c) a rephosphorylation of the 5' ends of the split products occurs, and then the tetraphosphate of the hnRNA would not represent the 5' end of the primary transcript. (41 references)

5336 ALKYLTHIOLATION. EVIDENCE FOR INVOLVEMENT IN CELL DIVISION. (Eng.) Toohey, J. I. (Dept. Medicine, Univ. California at Los Angeles, Los Angeles, CA 90024); Cline, M. J. *Biochem Biophys Res Commun* 70(4): 1275-1282; 1976.

Malignant murine hematopoietic cells (L1210, MOPC 21a, and LA-1), previously shown to require sulfhydryl compounds and serum for proliferation in vitro, grow well in medium lacking both of these components if methylthio compounds are provided at appropriate concentrations. The methylthio groups can be provided as the mixed disulfides of methyl mercaptan and various thiols. The optimal disulfide concentration is between 1 x 10^{-5} and 1 x 10^{-4} M. The cells can be maintained indefinitely in serum-free medium containing cysteine-methyl disulfide and one of several purified proteins. The evidence is consistent with the theory that these cells require an exogenous source of alkylthio groups for division, that serum is a source of these groups, and that sulfhydryl compounds act as carriers to transport the groups into the cells. Although the natural factor in sera has not been identified, methyl and ethyl mercaptans and dimethyldisulfide are normal human excretions; a protein of the type postulated, purified from *Streptococcus*, is a disulfide of a protein and an unidentified volatile mercaptan. A new diffusion analysis is described for quantitative measurement of disulfides of volatile mercaptans. (16 references)

5337 A PLATELET FACTOR STIMULATING HUMAN NORMAL GLIAL CELLS. (Eng.) Westermark, B. (Wallenberg Lab., Univ. Uppsala, S-75122 Uppsala, Sweden); Wasteson, A. *Exp Cell Res* 98(1): 170-174; 1976.

The multiplication stimulating activities of human serum and its fractions were determined as stimulation of ^{3}H-thymidine incorporation of serum-deprived human glial cells. The major part of the serum growth factor, stimulating human glial cells, is derived from the thrombocytes. Serum prepared from cell-free plasma had a considerably lower activity than serum prepared from whole blood. The major part of the growth-promoting activity of serum was ascribed to a platelet factor released during coagulation. The factor was trypsin-labile and heat-stable. The purified material was 600-700 times as active as normal human serum on a protein basis.

5338 AN ANALYSIS OF LECTIN-INITIATED CELL AGGLUTINATION IN A SERIES OF CHO SUBCLONES WHICH RESPOND MORPHOLOGICALLY TO GROWTH IN DIBUTYRYL CYCLIC AMP. (Eng.) Van Veen, J. (J. Hillis Miller Health Center, Univ. Florida, Gainesville, FL 32610); Roberts, R. M.; Noonan, K. D. *J Cell Biol* 70(1): 204-216; 1976.

The molecular basis of the agglutinability of CHO subclones that respond differentially in terms of morphology and surface architecture in the presence of dibutyryl cyclic AMP (db-cAMP) was investigated. It was demonstrated that the agglutinability of these subclones with wheat germ agglutinin (WGA) and concanavalin A (Con A) probably depends on the free lateral mobility of the lectin receptor sites in the membrane plane. The nonagglutinable surface architecture seems to depend on the presence in the membrane of a protease-labile peptide(s), which appears to be distinct from the lectin receptors, as well as on continuous protein and RNA synthesis. This dependence on continuous transcription and translation may be related to maintenance of the protease-labile peptide(s) in such a state as to restrict mobility of the lectin receptors. The surface architecture defined as nonagglutinable also depends on the state of polymerization of the intracellular microtubules and microfilaments. These microskeleta elements probably anchor the lectin receptors in su a manner as to restrict ther mobility and thereby reduce the relative agglutinability of a cell line. Control of the free mobility of both the Con A and WGA receptor sites is thought to be dependent on tw contraints, one applied by protease-labile (''surface'') membrane components and the other by components of the intracellular microskeletal system. (36 references)

5339 HETEROGENEITY OF IMMUNOREACTIVE CALCITONI IN THE PLASMA OF PATIENTS WITH MEDULLARY CARCINOMA. (Fre.) Moukhtar, M. S. (I.N.S.E.R.M. U. 113, C.H.U. Saint-Antoine, 27, rue de Chaligny, 75571 Paris Cedex 12, France; Jullienne, A.; Taboul J.: Calmettes, C.; Raulais, D.; Milhaud, G. *Pathol Biol (Paris)* 23(10): 809-814, 1975.

The plasma of patients with medullary carcinoma containing high levels of immunoreactive calcitoni were fractionated by filtration. The elution from each case resulted in four immunoreactive fraction Two of these fractions corresponded to the volume elution of the monomer and dimer of human calciton The other two fractions emerged at an elution volu corresponding to higher molecular weights. After i vivo stimulation of calcitonin secretion, the frac tions corresponding to the monomer and dimer increased more than the other two. Preliminary in vi studies of calcitonin secretion by medullary carcinoma tissue indicated the presence of four immun reactive forms with the same elution characteristi as those in the plasma. It is possible that the fractions not corresponding to the monomer and di may represent the precursors of calcitonin.

5340 RELATIONSHIP BETWEEN THE CONCENTRATION C NEUTROPHILS AND MONOCYTES IN VENOUS BLOC (Eng.) Bain, B. J. (Saint Mary's Hosp. Medical Sc Univ. London, London, England); Wickramasinghe, S. N. *Acta Haematol (Basel)* 55(2): 89-94; 1976.

The concentrations of circulating neutrophils and monocytes were compared in 100 normal adult males 100 normal nonpregnant females, 50 females in the last trimester of pregnancy, 15 patients with a persistent neutrophil leukocytosis, and 20 patien with polycythemia rubra vera, essential thrombocythemia, or myelofibrosis, and 16 patients with chronic granulocytic leukemia. Pre- and post-exercise venous blood samples were studied with a Coulter counter. A highly significant correlation was found between the logarithm of the concentrat of circulating neutrophil granulocytes plus metam locytes (log N) and the logarithm of the concentr tion of circulating monocytes (log M) in the normal adult males and females and in the pregnant females. A post-exercise increase in circula ting monocytes indicated that changes in the equi rium between the marginated and circulating leuko cyte pools affect the correlation between log N a log M. There was no correlation between log N and log M in the patients with reactive neutrophil le cytosis, polycythemia vera, myelofibrosis, or essential thrombocythemia, or chronic granulocytic leukemia. However, the relationship between log N and log M in the normal subjects applied to all but the leukemia patients when the median values for the concentration of circulating neutrophils and monocytes were considered. In the leukemia patients, the relationship between log N and log M was altered; the explanation for this ''abnormal'' relationship between log N and log M in chronic granulocytic leukemia is uncertain.

5341 ELECTROPHORETIC DISTRIBUTIONS OF HUMAN PERIPHERAL BLOOD MONONUCLEAR WHITE CELLS FROM NORMAL SUBJECTS AND FROM PATIENTS WITH ACUTE LYMPHOCYTIC LEUKEMIA. (Eng.) Smith, B. A. (Dept. Chemistry, Harvard Univ., Cambridge, MA 02138); Ware, B. R.; Weiner, R. S. *Proc Natl Acad Sci USA* 73(7); 2388-2391; 1976.

The electrophoretic mobilities of mononuclear white cells from the blood of normal subjects and patients with acute lymphocytic leukemia were measured in electrophoretic light-scattering experiments. Analysis of both fresh and cryopreserved samples of each type showed that cryopreservation had no distinguishable effect on the electrophoretic distribution of either normal or leukemic cells. Mode mobilities (mobilities at which maximum intensities are observed) of cells from nine leukemic patients were 7%-28% below the average mode mobility of normal cells. This implies a lower membrane charge density that may be due to a decrease in the net negative charge and/or an increase in cell surface area. The standard deviation of the electrophoretic mobilities of normal cells was 2%. Normal cells had an asymmetric, often bimodal, electrophoretic distribution; leukemic cells consistently had a single symmetric distribution, which suggests a homogeneous population of neoplastic cells. (16 references)

5342 THE EFFECT OF TWO ISOMERIC OCTADECENOIC ACIDS ON THE LIPID METABOLISM AND GROWTH OF NOVIKOFF HEPATOMA CELLS. (Eng.) Wennerstrom, D. E. (Dept. Microbiology, Univ. Arkansas for Medical Sciences, Little Rock, AR 72201); Jenkin, H. M. *Biochim Biophys Acta* 431(3): 469-480; 1976.

The origin and metabolism of octadecenoic acid (18:1) were examined in intact Novikoff rat hepatoma cells with the use of labeled precursors and two isomeric octadecenoic acids that differed in their abilities to stimulate cell growth in a serum-free medium. The isomers (cis-6-18:1 and cis-9-18:1) were measured in the cellular lipid by ozonolysis and reduction of the ozonides. The cis-6-18:1 was more extensively metabolized than the cis-9-18:1 to 16:1 and 20:1 fatty acids by chain shortening and chain elongation. Both isomers inhibited de novo fatty acid synthesis from acetate by cells suspended in a serum-free medium. The isomers did not exert coordinate control of both fatty acid and cholesterol biosynthesis in the Novikoff cells. The results indicate that the 18:1 fatty acid accumulated in the cell lipid by uptake of the preformed acid from the medium. (26 references)

5343 METABOLIC EFFECTS OF GLUCOSE DEPRIVATION AND OF VARIOUS SUGARS IN NORMAL AND TRANSFORMED FIBROBLAST CELL LINES. (Eng.) Schwartz, J. P. (St. Elizabeth's Hosp., Washington, DC 20023); Johnson, G. S. *Arch Biochem Biophys* 173(1); 237-245; 1976.

The sugar composition of the growth medium influenced the NAD+/NADH ratio, pyruvate and lactate production, and ATP levels in both normal and transformed fibroblast cell lines growing in tissue culture. Removal of glucose led to a rapid three- to fourfold rise in the NAD+/NADH ratio, followed by a slower decline in the content of ATP. There was no change in the adenylate energy charge [(ATP + 1/2ADP)/(ATP + ADP + AMP)] over a 2-hr period. The NAD+/NADH ratio was restored to the original level within 10 sec of glucose readdition. The ratios for cell lines grown on galactose were as high as for those incubated without sugars; growth on mannose or fructose produced intermediate ratios. There was an inverse relationship between the NAD+/NADH ratio and pyruvate-lactate production for glucose, fructose, and galactose so that all cell lines had a high production of pyruvate and lactate but a low NAD+/NADH ratio when grown on glucose. When galactose served as the sugar source, acid production was low, but the ratio was high. All cell lines had comparable hexokinase activity, and glucose was the best substrate, mannose intermediate, and fructose the poorest. Hexokinase activity did not correlate with the relative degree of sugar use. The sugar composition of the growth medium apparently affects the metabolic pattern of a cell line, including the NAD+/NADH ratio, the ATP content, and the production of pyruvate and lactate. There may be a metabolic site that determines the NAD+/NADH ratio for a given sugar. The change in ratio is due to a change in the redox potential.

5344 VARIATION IN GLYCOSAMINOGLYCAN COMPONENTS OF BREAST TUMORS. (Eng.) Takeuchi, J. (Fujita-Gakuen Univ. Sch. Medicine, Toyoake, Aichi 470-11, Japan); Sobue, M.; Sato, E.; Shamoto, M.; Miura, K.; Nakagaki, S. *Cancer Res* 36(7): 2133-2139; 1976.

The correlation between individual glycosaminoglycan content and histological patterns was studied in breast tumor tissues. The myxomatous stroma of intracanalicular fibroadenoma contained a large amount of glycosaminoglycans, mainly hyaluronic acid. The chondroitin 4- and 6-sulfate levels were also high. As the supporting stroma of this tumor became more dense and more fibrous, the hyaluronic acid level was reduced. In the case of pericanalicular fibroadenoma, the amount of glycosaminoglycans was small and hyaluronic acid and chondroitin sulfate levels were low, but the ratio of dermatan sulfate content was higher. In the case of gynecomastia, the content was almost the same as that of pericanalicular fibroadenoma. Scirrhous carcinoma tissues contained a relatively large amount of hyaluronic acid and chondroitin sulfate; no remarkable differences in heparan sulfate content were observed. Dermatan sulfate-chondroitin sulfate copolymers were detected in all the tumors. The presence of dermatan sulfate seemed to be related to the fibrogenesis in the interstitial stromal element of the tumor tissues. (27 references)

5345 THE METABOLISM OF ASCORBIC ACID, KETO-ACID AND OXYACID IN CELL NUCLEI OF SOME TUMORS. (Rus.) Romanovich, E. A. (North Osetia Medical Inst., Ordzhonikidze, USSR); Basieva, F. I. *Vopr Onkol* 21(10): 34-36, 1975.

The amount of the reduced and oxidized forms of ascorbic and pyruvic acids and the activity of decarboxylating malate dehydrogenase in the cell nuclei of uterine fibromyoma, glandular hyperplasia of the endometrium with epithelial proliferation, non-malignant ovarian cyst, and solid ovarian cancer was determined. The content of pyruvic acid and the reduced form of ascorbic acid was similar to the control level in uterine fibromyoma and ovarian cyst, decreased in glandular hyperplasia of the endometrium, and increased in solid ovarian cancer. A change in ascorbic, pyruvic, and malic acid metabolism in the cell nuclei of neoplastic tissues was connected with the predominance of glycolysis over respiration, against a background of the absence of the oxidized form of ascorbic acid and disappearance of malate dehydrogenase activity. The increase in the reduced forms of ascorbic and pyruvic acids in malignant tumors attests to the simultaneous intensification of glycolysis, cell malignancy, and depression of the cycle of tricarboxylic acids at the stage of oxidation of pyruvic acid.

5346 QUANTITATIVE ANALYSIS OF THE DISTRIBUTION OF ^{3}H-LEUCINE IN ACID SOLUBLE CHROMATIN PROTEINS OF NOVIKOFF HEPATOMA CELLS SEPARATED BY TWO-DIMENSIONAL POLYACRYLAMIDE GEL ELECTROPHORESIS. (Eng.) Taylor, C. W. (Nuclear Protein Lab., Dept. Pharmacology, Baylor Coll. Medicine, Houston, TX 77030); Yeoman, L. C.; Jordan, J. J.; Goldknopf, I. L.; Busch, H. *Physiol Chem Phys* 8(1): 3-12; 1976.

The synthesis of histones and nonhistone nuclear proteins in Novikoff hepatoma was investigated. The acid-soluble proteins of hepatoma chromatin were labeled linearly with ^{3}H-leucine for 16 min. Analysis on two-dimensional polyacrylamide gels showed that 13 of the 18 stained proteins were detected by autoradiography after a 16-min in vitro incubation. The labeled molecules included the histones H2A, H2B, H3, and H4 and the proteins A3, Aj, A8, A8', A15, A16, A24, B7, and B13. Relatively large amounts of isotope were incorporated into proteins A3 and Aj, in addition to the histones. Some proteins, notably Aj, A8, A8', and A16, were labeled to a greater extent than was expected on the basis of uptake of Coomassie Brilliant Blue R. None of the labeling patterns were characteristic of a precursor-product relationship for either the histones or the nonhistone proteins. (25 references)

5347 SELECTIVE CONTROL OF THE DEGRADATION OF
NORMAL AND ABERRANT PROTEINS IN REUBER H35
HEPATOMA CELLS. (Eng.) Knowles, S. E. (CSIRO, Div.
Human Nutrition, Adelaide, S. Australia 5000, Austra
lia); Ballard, F. J. *Biochem J* 156(3): 609-617;
1976.

To remove abnormal protein from a cell efficiently,
the proteolytic degradation process must be independ
ent of physiological controls that regulate normal
protein turnover. This study indicates that many
agents that inhibit overall protein degradation do
not decrease the catabolism of abnormal proteins.
Rates of normal and abnormal protein degradation
were measured in hepatoma cells after labeling firs
for 16 hr with [^{14}C]leucine plus L-arginine and the
for 3 hr with [^{3}H]-leucine plus the arginine analog
L-canavanine. Over the first 2 hr of degradation,
canavanine-containing proteins were degraded at
approximately 5 times the average normal protein
degradation rate. Degradation of normal proteins wa
inhibited 30% by insulin, cycloheximide, puromycin,
leupeptin, antipain, and fetal calf serum, but thes
agents had a negligible effect on the breakdown of
canavanine-containing proteins. Other compounds
inhibited degradation of both classes of protein to
equal extents. Combination experiments showed no
additional inhibitory effects on normal protein
degradation over degradation measured in the prese
of a single selective inhibitor. In contrast with
the results with a 16-hr labeling period, degradat
of normal proteins labeled for only 3 hr was not
inhibited by insulin. These results are explained
a model with two distinct protein turnover pathway
The first involves the formation of autophagic vac
oles and would be completely inhibited by each of
the selective inhibitors. Normal and canavanine-co
taining proteins would be catabolized by this path
at equal rates. It is proposed that degradation by
second pathway is not regulated by the agents test
but by the inherent stability of each protein. (31
references)

5348 EVALUATION OF PROXIMITY INHIBITION OF DN
SYNTHESIS IN 3T3 CELLS. (Eng.) Harel, L.
(Institut de Recherches sur le Cancer, Boite Posta
N. 8 94 800, Villejuif, France); Jullien, M. *J Cel*
Physiol 88(2): 253-254; 1976.

DNA synthesis in 3T3 cells is dependent on the ce
density and independent of the overall population
The authors have shown that in 3T3 cells the rate
of phosphate uptake and DNA synthesis are inverse
proportional to the square root of the cell densi
It is suggested that DNA synthesis depends on the
mean intercellular distance. A mathematical trans
formation is presented to linearize the relation
between cell density and cell metabolism. The dat
show a 50% decrease in DNA synthesis when the dis
tance between cells varies from 120 to 80 μm. Lin
arization of the relation between the DNA labelin

index and the intercellular distance does not prove the dependence of DNA synthesis on cell proximity, but it does allow easier comparison of proximity inhibition in different normal or transformed cell types. (5 references)

5349 BIOSYNTHESIS AND STABILITY OF GLOBIN mRNA IN CULTURED ERYTHROLEUKEMIC FRIEND CELLS.

(Eng.) Aviv, H. (Dept. Virology, Weizmann Inst. Science, Rehovot, Israel); Voloch, Z.; Bastos, R.; Levy, S. *Cell* 8(4): 495-503; 1976.

The biosynthesis and stability of the messenger RNA (mRNA) population in dimethylsulfoxide (DMSO)-induced Friend erythroleukemic cells were studied after labeling the RNA with ^{3}H-uridine and chasing it with nonlabeled uridine. Globin RNA metabolism was studied by hybridization to excess complementary DNA covalently coupled to oligo(dT)-cellulose. After a labeling period of 120 min, 2%-4% of the poly(A)-containing labeled RNA was in globin RNA; it decayed with a half-life of 16-17 hr. The rest of the poly(A)-containing RNA was composed of two kinetic populations: 85%-90% decayed with a half-life of about 3 hr, and 10% decayed with a half-life of about 37 hr. During the initial chase period, the percentage of globin RNA increased rapidly, reaching a maximum of about 15% at 20 hr, but it subsequently declined gradually. Based on these findings, a model was built that describes the changes in the proportion of globin mRNA in poly(A)-containing RNA during continuous synthesis and after chase of the labeled RNA. If the parameters described remained constant during the maturation of erythroblasts, this model would not account for the almost exclusive presence of globin RNA in the reticulocyte. By far the most effective way to achieve this high level of globin RNA is destabilization of the mRNA population, which is more stable than globin RNA, and not stabilization of the globin RNA itself. (35 references)

5350 INDUCTION OF GLOBIN mRNA ACCUMULATION BY HEMIN IN CULTURED ERYTHROLEUKEMIC CELLS.

(Eng.) Ross, J. (McArdle Lab. Cancer Res., Univ. Wisconsin, Madison, WI 53706); Sautner, D. *Cell* 8(4): 513-520; 1976.

The role of heme in erythroid development was investigated in erythroleukemic (Friend) cells. Exogenous hemin induced the accumulation of globin mRNA and globin protein in T3-C12 erythroleukemia cells to levels comparable to those induced by polar solvents, such as dimethylsulfoxide (DMSO). The hemin concentration required for maximal induction (10^{-4} M) was the same as that which stimulates globin message translation in reticulocytes or cell-free reticulocyte lysates. Hemin and DMSO together caused T3-C12 cells to accumulate eight to nine times more globin mRNA than either inducer individually. The kinetics of globin mRNA induction in hemin compared to DMSO were very different: globin message accumulation began 4 hr after hemin addition, but not until 30-40 hr after DMSO addition. Biliverdin induced 20 to 40-fold less hemoglobin than hemin; δ-aminolevulinic acid and porphobilinogen did not induce any detectable levels of hemoglobin. It is concluded that hemin induces hemoglobin accumulation in two lines of erythroleukemic Friend cells. (36 references)

5351 ENZYMATIC IN VITRO SYNTHESIS OF GLOBIN GENES.

(Eng.) Efstratiadis, A. (Biological Labs., Harvard Univ., Cambridge, MA 02138); Kafatos, F. C.; Maxam, A. M.; Maniatis, T. *Cell* 7(2): 279-288; 1976.

Full-length, single-stranded rabbit globin cDNA, synthesized by avian myeloblastosis virus (AMV) reverse transcriptase, apparently contains a small double-stranded sequence (hairpin) at the 3' terminus. This cDNA can serve as template-primer for *Escherichia coli* DNA polymerase I, which synthesized a strand complementary to the cDNA and covalently bound to it. The loop connecting the two strands can be cut by S1 nuclease. Reassociation, hybridization, and restriction endonuclease studies, as well as electrophoretic analyses, indicated that the sequential actions of reverse transcriptase, DNA polymerase I, and S1 nuclease generate full-length, double-stranded synthetic globin genes.

5352 ENZYMES OF NUCLEIC ACID METABOLISM IN HUMAN LEUKEMIA.

(Eng.) Schoech, G. (Molekularbiologisch-haematologische Arbeitsgruppe, Kinderklinik, Universitaetskrankenhaus Eppendorf, 2 Hamburg 20, West Germany); Heller-Schoech, G.; Grosch-Woerner, I.; Neth, R.; Mertelsmann, R.; Kaukel, E.; Garbrecht, M.; Landbeck, G.; Hausmann, K.; Skrandies, G. *Adv Biosci* 14: 495-508; 1975.

Cyclic AMP and the specific activities of N-substituted aminoacyl-transfer RNA (tRNA) hydrolase, RNA methyltransferases, and DNA-dependent DNA and RNA polymerases were measured by microassay in fractionated normal and leukemic human leukocytes. These parameters, which represent different levels of nucleic acid metabolism, showed significant differences in normal and leukemic blood cells; however, only DNA-dependent RNA polymerase activities appeared to correlate with the prognosis of disease. RNA polymerase activities A and B in isolated leukocyte nuclei were significantly increased in leukemic cells (215%-611% and 62%-774%, respectively) compared to normal controls (100%). These enzyme activities also seemed to correlate with the clinical stage of the disease, as evidenced by RNA polymerase A and B activities of 450% and 774% in four untreated patients with chronic myelocytic leukemia versus activities of 245% and 333% in four chronic myelocytic leukemic patients during remission. The activity of DNA-dependent RNA polymerase B appears to be particularly significant in terms of prognostic importance. Follow-up studies during remission and relapse are in progress to analyze the prognostic relevance of varying cyclic AMP levels in human leukemic leukocytes, since this compound seems to be important for the regulation of normal and leukemic cell differentiation. (28 references)

5353 ESTIMATION OF TUMOR GROWTH FRACTION IN MURINE TUMORS BY THE PRIMER-AVAILABLE DNA-DEPENDENT DNA POLYMERASE ASSAY. (Eng.) Schiffer, L. M. (Allegheny General Hosp., Pittsburgh, PA 15212); Markoe, A. M.; Nelson, J. S. R. *Cancer Res* 36(7): 2415-2418; 1976.

The tumor growth fraction measured by the percentage labeled mitoses method has been determined in transplantable solid and ascites murine tumors, the latter being measured at different times after transplantation. These values were compared to an in vitro, autoradiographic assay that determines the fraction of cells in a given population [primer-available DNA-dependent DNA polymerase index (PDP)] that have both nuclear DNA-dependent DNA polymerase and DNA capable of acting as primer-template. It appears that almost all cells with a short G_1 phase duration (< 19 hr) that are within the proliferative cycle are PDP positive. The results of the comparison indicate that the PDP estimation of growth fraction is very nearly identical to the growth fraction measured by the percentage labeled mitoses method. (22 references)

5354 COMPARISON OF ZYMOGRAM OF THREE LYMPHOBLASTOID CELL LINES WITH A NEW MICROTECHNIQUE. (Eng.) Nardon, P. (Laboratoire de Biologie, Institut National des Sciences Appliquees, 20, Bld Einstein, 69621 Villeurbanne, France); Monget, D.; Didier-Fichet, M. L.; de-The, G. *Biomedicine* 24(3): 183-190; 1976.

The enzymatic activities of three lymphoblastoid cell lines were subjected to a comparative analysis of 22 enzymatic activities with a new microtechnique called apizym. This method was easy, required only a small number of cells, and allowed the simultaneous testing of many enzymatic activities from the same sample. The three cell lines could be easily distinguished despite their close origin: NAB, derived from a malignant retroperitoneal mass, had the greatest total activity and HR1K (a clone of P3J, derived from an African lymphoma) had the lowest. RAJI (a non-virus-producing line derived from an African lymphoma) was the intermediate. The more striking differences concerned the activity of phosphatases (NAB > RAJI ≥ HR1K), esterases-lipases (NAB ≥ RAJI > HR1K), β-glucosaminidase, β-glucuronidase, and β-glucosidase (NAB ≥ RAJI > HR1K). On the other hand, α-mannosidase and α-fucosidase were more active in RAJI (RAJI > NAB ≥ HR1K). (22 references)

5355 PROTEIN KINASES FROM LIVER MITOCHONDRIA OF TUMOR-BEARING RATS. (Eng.) Sankaran, K. (Biochemistry and Food Technology Div., Bhabha Atomic Res. Centre, Trombay, Bombay 400 085, India); Pawse, A. R.; Nadkarni, G. B. *Biochim Biophys Acta* 438(2): 412-423; 1976.

The differential responses of molecular forms of mitochondrial protein kinases to cyclic AMP (cAMP) and their possible role in the phosphorylation of proteins in the host liver were studied. The mitochondria of the liver of Yoshida ascites tumor-bearing male Wistar rats contained two forms of protein kinase distinguishable on the basis of their kineti properties, substrate specificity, and responses to cAMP. One of these (kinase I) was activated two- to threefold by cAMP, while the other form (kinase II) was insensitive to the action of cAMP. Kinase I, which was selective toward histone F1 as a substrat was obtained as a homogeneous preparation and was found to have a molecular wt of 170,000 by Sephadex G-150 gel filtration. Protein kinase II appeared to be a smaller protein with a molecular wt of 54,000 and was specific toward the acidic proteins casein and phosvitin. The protein kinases isolated with th liver mitochondria of normal rats showed variations with respect to their elution profiles and electrophoretic mobility. The preparation corresponding to kinase I did not show stimulatory responses to cAMP (44 references)

5356 γ-GLUTAMYL TRANSPEPTIDASE, A LYMPHOID CELL-SURFACE MARKER: RELATIONSHIP TO BLAS TOGENESIS, DIFFERENTIATION, AND NEOPLASIA. (Eng.) Novogrodsky, A. (Dept. Biochemistry, Cornell Univ. Medical Coll., New York, NY 10021); Tate, S. S.; Meister, A. *Proc Natl Acad Sci USA* 73(7): 2414-241 1976.

γ-Glutamyl transpeptidase, an enzyme that catalyze γ-glutamyl transfer from γ-glutamyl compounds to amino acid and peptide acceptors, and which is loc ized in the membranes of many epithelial cells, wa found in a variety of lymphoid cells. The lymphoid cell enzyme is located on the cell surface and exhibits substantially the same substrate specificit as the enzyme found in epithelial cells. Human and rat (but not mouse) lymphocyte γ-glutamyl transpep tidase was stimulated by treatment of the cells wi mitogens. Normal human peripheral B cells were mor active than T cells, but the reverse relationship activities was found in chronic lymphocytic leukem lymphocytes. Human lymphoblastic lines vary marked in activity. In general, cell lines with B and T characteristics from patients with lymphoprolifera diseases had much lower activities than those of B cell lines derived from normal subjects. The highe activity found was in a human myeloma line active synthesis of an immunoglobulin light chain. The da indicate that γ-glutamyl transpeptidase is a surfa marker reflecting differentiation in normal and neoplastic cells. (24 references)

5357 STIMULATION OF ORNITHINE DECARBOXYLASE SYNTHESIS AND ITS CONTROL BY POLYAMINES REGENERATING RAT LIVER AND CULTURED RAT HEPATOMA CELLS. (Eng.) Canellakis, Z. N. (Dept. Pharmacolo Yale Univ. Sch. Medicine, New Haven, CT 06510); Theoharides, T. C. *J Biol Chem* 251(14): 4436-4441; 1976.

Ornithine decarboxylase was induced in log phase hepatoma cells grown in suspension culture. Induc tion with $N^6,O^{2'}$-dibutyryl cyclic AMP produced a fourfold increase in enzyme activity by 3 hr that was followed by a return to base levels by 6 hr.

Induction with dexamethasone, a potent synthetic glucocorticoid, produced a slow steady increase that reached a plateau of approximately five- to sixfold stimulation by about 12 hr. Induced cell and regenerating rat liver ornithine decarboxylases were indistinguishable by titration with antibody monospecific to the latter and by heat stability. L-[^{14}C]Leucine incorporation into immunoprecipitable enzyme protein after induction in vitro or partial hepatectomy showed an increase that, when coupled with the increase in enzymatic activity, indicated de novo synthesis of enzyme protein. Physiological concentrations of the polyamines spermidine and spermine inhibited cyclic AMP induction, but they had no effect on dexamethasone induction. Both inductions were inhibited by cycloheximide; in contrast, inhibition by actinomycin D was complete for dexamethasone induction and only partial for cyclic AMP induction. The different time pattern of induction with cyclic AMP and dexamethasone and the partial inhibition of cyclic AMP induction with actinomycin D, as well as the absence of inhibition of dexamethasone induction by polyamines indicate that these inducers might affect different aspects of the control of the same enzyme. (55 references)

5358 COMPARISON OF REGULATION OF 3-HYDROXY-3-METHYLGLUTARYL COENZYME A REDUCTASE IN HEPATOMA CELLS GROWN IN VIVO AND IN VITRO. (Eng.) Beirne, O. R. (Univ. California at San Francisco, Dept. Biochemistry and Biophysics and Liver Center, San Francisco, CA 94143); Watson, J. A. *Proc Natl Acad Sci USA* 73(8): 2735-2739; 1976.

Hepatoma 7288C, which lacks feedback regulation of cholesterol synthesis in vivo but expresses this property in vitro (then called HTC), was used as a model system to determine (a) whether an established hepatoma cell line that modulates its cholesterol synthesis in vitro can express this property in vivo and (b) whether cells reisolated from the tumor mass have the same regulatory phenotype as before transplantation. Long-term growth of hepatoma 7288C in tissue culture did not cause a biotransformation permitting feedback regulation of 3-hydroxy-3-methylglutaryl coenzyme A reductase (HMG-CoA reductase) when the cells were transplanted back into host animals (Buffalo rats). In addition, HTC cells reisolated from the tumor mass and established in tissue culture continued to have the ability to regulate HMG-CoA reductase activity. Therefore, malignant transformation is not categorically linked to the loss of the cellular components necessary to regulate sterol synthesis and HMG-CoA reductase activity. (32 references)

5359 OCCURRENCE OF α-FETOPROTEIN, REGAN ISOENZYME, AND VARIANT ALKALINE PHOSPHATASE IN THE SERUM OF A PATIENT WITH GASTRIC CANCER. (Eng.) Nishimura, H. (Dept. Internal Medicine and Pathology, Yamaguchi Univ. Sch. Medicine, Ube, Japan); Okamoto, Y.; Takahashi, M.; Fujita, T. *Gastroenterology* 71(3): 497-499; 1976.

Regan isoenzyme, variant alkaline phosphatase, and α-fetoprotein were found in the serum of a 72-yr-old man with gastric cancer. The histology of the tumor was tubular adenocarcinoma. There were metastases in the retroperitoneal lymph nodes, but not in the liver. The liver was normal microscopically, with no evidence of bile duct obstruction. α-Fetoprotein in the tumor tissue was detected by immunoprecipitation reaction in agar. Regan isoenzyme and variant alkaline phosphatase were also detected in the tumor tissue, and the total alkaline phosphatase activity of the tissue was very high. These findings suggested their tumor origin. (9 references)

5360 PEROXIDASE IN ESTROGEN-SENSITIVE TISSUES. (Eng.) Jellinck, P. H. (Depts. Biochemistry and Biology, Queen's Univ., Kingston, Ontario, Canada); McNabb, T.; Cleveland, S.; Lyttle, C. R. *Adv Enzyme Regul* 14: 447-465; 1976.

The partial purification and characterization of a peroxidase that was induced rapidly in immature female albino Holtzman rats (21-28 days old) by physiological doses (20 µg/kg body wt, sc) of estradiol are described along with evidence that the enzyme is produced in situ and is distinct from eosinophil peroxidase. Cycloheximide (3 mg in saline, ip), which blocks the increase in peroxidase activity brought about by estrogens, was used to determine the half-life (about 4 hr) of the induced uterine enzyme. The subcellular localization of the enzyme after estrogen treatment was examined by sucrose density gradient centrifugation; the peroxidase was shown to be localized in particles sedimenting more rapidly than mitochondria (succinic dehydrogenase marker) or lysosomes (acid phosphatase marker). The peroxidase activity of mammary tumors induced in female Sprague-Dawley rats by the gastric instillation of 7,12-dimethylbenzanthracene (10 mg/ml) in sesame oil (15 mg initial dose at age 50-55 days followed by 10 mg 1 wk later) was also determined and compared with the properties of lactoperoxidase. A wide variation in peroxidase activities of the induced mammary tumors was observed in both fresh and frozen tumor preparations and even between individual tumors obtained from the same animal. The properties of the enzyme found in the tumors were similar to those of lactoperoxidase with respect to cofactor requirement and response to enzyme inhibitors. If the tumor enzyme is, in fact, lactoperoxidase, tumor peroxidase production in breast cancer might possibly be affected by the same factors that influence milk production by this tissue. Evidence that the presence of peroxidase is characteristic of all proliferating tissue was not obtained. (49 references)

5361 STUDIES ON OESTROGEN-BINDING PROTEINS (OESTROGEN RECEPTORS). (Eng.) Bresciani, F.; Nola, E.; Sica, V.; Puca, G. A. *In: Host Environment Interactions in the Etiology of Cancer in Man. Proceedings of a Meeting Held at Primosten, Yugoslavia, 27 August-2 September 1972.* International Agency for Res. on Cancer (Lyon, France): pp. 149-157; 1973.

The results of purification and characterization studies of estrogen binding (EB) proteins from prepubertal calf uterus are reviewed. Only three forms of molecular EB protein were recognized. There is an 8.6S, 240,000 molecular wt form present in cytosol; this state changes into a 5.3S, 118,000 molecular wt form after the ionic strength of the medium is increased. The next step is the formation of a smaller, low-salt stable 4.5S, 60,000 molecular wt protein. It is suggested that formation of the 4.5S EB protein by the receptor-transforming (RT) factor is the step whereby confinement to the cytoplasm of the larger 5.3S-8.6S system is overcome and thereby nuclear penetration of the estrogen-protein complex is allowed. The main properties of the RT-factor are: sedimentation coefficient 6.4; molecular wt 110,000; isoelectric point 4.9; it is destroyed by proteases but not by nucleases and by heating at 60 C for 20 min; it is present in the 105,000 g supernatant; it is inactive and stable in the absence of Ca^{2+}; Mn^{2+} and Sr^{2+} may, in part, replace calcium; and its activity is unaffected by phenylmethylsulfonyl fluoride. It is clear that the RT factor is in part protein and an entity different from the EB proteins. It does not bind estrogen but shows a high affinity for the 5.3S EB protein. Preliminary evidence suggests that the RT factor is a protease; it is not of the trypsin group. (20 references)

5362 MEASUREMENT OF DNA CONTENT AND CELL VOLUME IN AGEING HUMAN DIPLOID FIBROBLASTS UTILIZING FLOW MULTIPARAMETER SINGLE CELL ANALYSIS (Meeting Abstract). (Eng.) Schneider, E. L. (Natl. Inst. Aging, Baltimore, MD); Fowlkes, B. J. *J Cell Biol* 67(2/Part 2): 388a; 1975.

5363 LOCATION OF A1A32 GENE REPLICATION IN THE CELL CYCLE OF CULTURED MAMMALIAN CELLS, L5178Y (Meeting Abstract). (Eng.) Suzuki, N. (M. D. Anderson Hosp., Houston, TX 77025); Okada, S. *J Cell Biol* 67(2/Part 2): 423a; 1975.

5364 RE-EXPRESSION OF HUMAN GENES IN HUMAN-MOUSE HYBRID CELLS (Meeting Abstract). (Eng.) Bordelon, M. R. (Dept. Cell Biology, Baylor Coll. Medicine, Houston, TX 77030); Siciliano, M. J.; Kohler, P. O. *J Cell Biol* 70(2/Part 2): 228a; 1976.

5365 PERICENTROMERIC CHROMOSOME ORGANIZATION IN MOUSE CELLS (Meeting Abstract). (Eng.) Bianchi, N. D. (IMBICE.-C.C. 130, La Plata 1900. Argentina); Bianchi, M. S.; Lezana, M. E.; Vidal Rioja, L. A. *J Cell Biol* 70(2/Part 2): 419a; 1976.

5366 POLYPLOIDIZATION AND G2-ARREST DURING THE PLATEAU PHASE OF GROWTH OF EHRLICH ASCITES TUMOR CELLS (Meeting Abstract). (Eng.) Andersson, G. (Inst. Zoophysiology, Univ. Lund, S-223 62 Lund, Sweden). *J Cell Biol* 70(2/Part 2): 197a; 1976.

5367 NEUTROPENIC AND NORMAL HUMAN BONE MARROW CELLS: AN ANALYSIS OF COLONY FORMATION IN CULTURE BY VELOCITY SEDIMENTATION (Meeting Abstract). (Eng.) Wiseman, L. L. (Biology Dept., Coll. William and Mary, Williamsburg, VA); Price, G. B.; Senn, J. S. *J Cell Biol* 67(2/Part 2): 458a; 1975.

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ARONSON, S. A.
5031
ARSSEN, A. M.
5032
BLIN, R. J.
5141*
CHESON, N. H.
5075*
CKERMAN, G. A.
5256*
DEMCVIC, S.
5188
DESCLA, A.
5310*
FROUDAKIS, A. P.
5305*
GBATA, A.
5182
HEARN, M. J.
5257*
HRENBERG, P.
5244*
IDA, M.
4998
L-HINDAWI, A. Y.
4982*
LBERT, R. E.
4963
LBERT, S.
5312*
LDERSON, M. R.
5316*
LEKSANDROWICZ, J.
4947*
LLEGRETTI, N.
5120*
LLEN, J.
5299*
LTENBURG, B.
5055*
LTHOFF, J.
5276, 5277
LTMANN, H.
5159
MES, E.
4876*
MES, B. N.
4814
MMANN, R. W.
5200
NDERSSON, G.
5366*
NDREEV, M. D.
5187
NTOMCNOV, Y. G.
4929*
OKI, T.
5138*
PPENROTH, D.
5146
RAI, M.
4892
RAKI, H.
5245*
RCOS, J. C.
4899
RENS, M.
5023
ARGUS, M. F.
4899
ARJUNGI, K. N.
4895
ARLINGHAUS, R. B.
5059*
ARMSTRONG, B.
5274
ARNOLD, W.
5209
ARNOULD, G.
5216*
ARTZT, K.
4829
ASAL, N. R.
5306*
ASBOT, R.
4987
ATKINSON, J. P.
5135*, 5136*, 5143*
AUGUST, J. T.
5071*
AUGUST, M.
5260*
AURELIAN, L.
4825
AUSTIN, D. F.
5296*
AUSTIN, S. D.
5177
AVIV, H.
5349
BACKSTAHLER, L. E.
5017
BAGUET, J. C.
5189
BAILEY, J. M.
5033
BAIN, B. J.
5340
BAKALOV, V.
5230*
BAKER, K.
4943*
BAKHSHALIEVA, F. G.
5273
BALDAUF, K.
5129*
BALINT, R. F.
5384*
BALLARD, F. J.
5347
BALMAIN, A.
4936*
BANERJEE, S.
4887
BAPTISTA, A.
5212*
BARAKINA, N. F.
4964
BARBLAN, C.
5287
BARRATT, P. J.
5229*
BARRETT, L. A.
5225*, 5226*
BARRILE, A.
5239*
BARTHOLOMEW, J.
5054*
BASA, G. F.
4839
BASIEVA, F. I.
5345
BASILICO, C.
5076*
BASTOS, R.
5349
BATTIGELLI, M. C.
4981*
BATZENSCHLAGER, A.
5150
BEAL, L. P.
4991
BEAN, M. A.
5122*
BEAUMARIAGE, M. L.
4979*
BECHTEL, R. C.
5177
BECHTELSHEIMER, H.
5193
BECKER, H. J.
5199
BEDIGIAN, E. P.
5048*
BEG, M. U.
4884
BEIL, M.
5280
BEIRNE, O. R.
5358
BELLOWS, B.
5234*
BENDER, E.
4995, 5209
BENDER, T. R.
5294*
BENDINELLI, M.
5108
BENNETT, D.
4829
BENTVELZEN, P.
5032
BENYESH-MELNICK, M.
5014
BERARD, C. W.
5102
BEREZOV, T. T.
5334
BERG, P.
5008
BERGER, D.
4817
BERGER, H.
5157
BERGERAT, J. P.
5150
BERGET, S. M.
5085*
BERLIN, B.
5235*
BERNARD, J.
4837
BERNDT, H.
5269

BERNSTEIN, A.
5045*
BERTHELOT, N.
5086*
BERTHIER, R.
4845
BERTOLLI, T. A.
5296*
BETTENDORF, U.
5213*
BHATTACHARYYA, M. H.
4960
BHATTI, R.
5141*
BHUYAN, B. K.
4918
BIANCHI, M. S.
5365*
BIANCHI, N. D.
5365*
BIASI, G.
5057*
BIEDLER, J. L.
5395*
BIGNER, D. D.
5131*
BIKCRIZ, A. I.
4896
BILLING, R. J.
5126*
BILLS, D. C.
4953*
BISSELL, D. M.
5371*
BISSELL, M. J.
5054*, 5371*
BIVINS, B. A.
5308*
BLACK, E. G.
4982*
BLACK, M. M.
4828
BLAJCHMAN, M. A.
5134*
BLANK, K. J.
5043*
BLOOMFIELD, C. D.
5263*
BLOT, W. J.
5294*
BLOUT, E.
5375*
BLUMENSON, L. E.
4985*
BOBOTAS, G.
4940*
BOCKER, W.
5186
BOECKER, B. B.
4978*
BOICE, J. D.
4986*
BOJSEN-MOLLER, M.
5221*
BOLL, I.
5155
BOLT, H. M.
4854
BOLT, W.
5191
BOMHOFF, G.
4881
BONIVER, J.
4979*
BOOKWALTER, J. R.
5311*
BOORMAN, G. A.
5183
BORDELON, M. R.
5364*
BORSOS, T.
5133*
BOSMAN, C.
5290
BOURGES, M.
5189
BOWERS, T.
5263*
BRACKMANN, K.
5023
BRAITHWAITE, S.
4983*
BRANKOW, D. W.
4904
BRAYLAN, R. C.
5102
BRDAR, B.
4994
BREINL, H.
5173, 5174
BRESCIANI, F.
5361
BREUER, H.
5163
BRISON, O.
5081*
BROOKES, P.
4911
BROOKS, M. H.
4983*
BROSS, I. D.
4985*
BROUET, J. C.
5101, 5106
BROWN, D. R.
5387*
BROWN, E. R.
4876*
BROWN, J. L.
5392*
BROWN, J. M.
4861*
BROWN, R.
5088*
BROWN, S. M.
5296*
BRUNK, U. T.
4966
BRUNNER, K. T.
5092
BRUNS, G. R.
5141*
BRYANT, G. M.
4899
BUCHANAN, P.
5091*
BUCHTER, A.
5191
BUREK, J. D.
5183
BURK, M. W.
5118*
BURNS, F. J.
4963
BURNY, A.
5004
BURR, J. G.
4990
BURTIN, P.
4834
BUSCH, H.
5346
BUSCH, R. H.
4980*
BUSHAR, G. S.
5138*
BUSHONG, S. C.
4937*
BUTLER, J. J.
4875*
BUTTNER, W.
5023
BYERS, V.
5223*
CADY, B.
5311*
CAHILL, D. F.
4959
CALARCO, P. G.
5052*
CALLEN, J.
5299*, 5300*
CALMAN, F.
5260*
CALMETTES, C.
5339
CALVELLI, T. A.
5370*
CALVIN, M.
4939*
CAMERON, E. C.
4934*
CANADY, W. J.
4912
CANELLAKIS, Z. N.
5357
CARDESA, A.
5276, 5277
CARNEY, J. A.
5160
CARPENTER, G.
5382*
CASTOR, L. N.
5393*
CAVALIERI, E.
4939*
CEDERMARK, B.
5308*
CENTIFANTO, Y. M.
5022
CERNEA, M.
5164
CEROTTINI, J. C.
5092

CHAMBON, P.
5081*
CHAN, C. C.
5056*
CHATRENNE, H.
5004
CHEMINAT, J. C.
5189
CHEN, L. B.
5079*
CHEN, T. K.
4873*
CHEVALIER, A.
5189
CHIECO-BIANCHI, L.
5057*
CHILD, M. A.
5312*
CHIN, W. W.
5084*
CHIPOWSKY, S.
4879*
CHLUD, K.
4946*
CHRISTIE, G.
5385*
CHRISTINE, B. W.
5318*
CHSHMARITIAN, C. S.
5020
CLAPP, N. K.
4954*
CLEMENTS, J. B.
5082*
CLEUTER, Y.
5004
CLEVELAND, S.
5360
CLINE, M. J.
5336
CODINGTON, J. F.
5264*
COHEN, B. L.
4957
COHEN, E. P.
5094
COHEN, S.
5382*
COHEN, S. M.
4892
COLBY, H. D.
4912
COLE, E. N.
4943*
OLE, F.
5282
OLLAVO, D.
5057*
OLOMBATTI, A.
5057*
ONNEALLY, P. M.
5232*
ONNEY, A. H.
4905
OCKE, F. F.
5281
OOPER, R. A.
5196
CORDERO MORENO, R.
5241*
CORENBLUM, B.
5162
CORI, G. C.
5290
CORNATZER, W. E.
5047*
CORREA, P.
4841
COTTER, S. M.
5061*
COURTOIS, H.
5168
COURTOY, R.
4979*
CRAVIOTO, H.
5113*
CRAWFORD, D. H.
5028
CREECH, J. L.
5284
CREEHAN, P.
4871*
CROCE, C. M.
5071*
CRUZ-BASA, A. G.
4839
CULO, F.
5120*
CULTER, S. J.
5319*
CUSTER, R. P.
4900
CZITROM, A. A.
5114*
D'AGOSTINO, M. A.
5036*
DAITCH, P. B.
5301*
DALLENBACH-HELLWEG, G.
4848
DALQUEN, P.
4930*
DALY, M. B.
5317*
DALY, T. M.
5066*
DANESHBOD, A.
5315*
DAS, J.
5029
DAUNE, M. P.
4933*
DAUWALDER, M.
5050*
DAVIDES, K. C.
5231*
DAVIDSON, N.
5033
DAVIDSON, R.
5375*
DAVIES, R. E.
4817
DAVIS, D.
5252*
DAWSON, P. J.
4999
DAY, E. D.
5131*
DAY, N. K.
5142*
DAYTON, P. W.
5301*
DE BEAUX, J.
5310*
DE BRUX, J.
5175
DE CLEENE, M.
4950*
DE GROOT, F. G.
5032
DE HARVEN, E.
5260*, 5370*
DE LEY, J.
4950*
DE-THE, G.
5027, 5354
DE VILLIERS, E. M.
5062*
DECROIX, G.
5218*
DEEB, S.
5372*
DEHNHARD, F.
5173, 5174
DEINHARDT, F.
5014
DEKEGEL, D.
5004
DELORME, F.
5284
DEMSEY, A.
5053*
DENT, P. B.
5134*
DESGRANGES, C.
5027
DEVESA, S. S.
5319*
DEXTER, T. M.
4894
DEYHLE, P.
5200
DIAD'KOVA, A. M.
4992
DICKE, K. A.
5257*
DIDIER-FICHET, M. L.
5354
DIETRICH, M.
5149
DIMMOCK, N. J.
5006
DMOCHOWSKI, L.
5009
DOBOZY, A.
5104
DOBROWOLSKI, J.
4947*
DOLAN, M. L.
5383*
DOLL, R.
5274
DOMELLOF, L.
5203

DOUADY, F.
4845
DOUGLAS, S. D.
4949*
DOUVIN, D.
5215*
DOWLATSHAHI, K.
5315*
DRESLER, S. L.
4999
DRUCKER, I.
5332
DU P. HEYNS, A.
5262*
DUECK, J. H.
4955*
DUELL, E. A.
4871*
DURANTEZ, A.
5140*
DVORAK, M.
4993
DWIVEDI, F. S.
5266*
EBELING, K.
5170
EBERS, G.
4895
EDGREN, J.
4984*
EDLEMAN, G. M.
4831
EFSTRATIADIS, A.
5351
EL ETREBY, M. F.
5161
ELBADAWI, N. A.
5196
ELBLING, L.
4832
ELKIND, M. M.
4863*
ELS, H. J.
5062*
ENGERS, H. D.
5092
EPSTEIN, M. A.
4824, 5028, 5090*
ERICHSEN, H. G.
5303*
ERICKSON, C. A.
5077*
ERICSSON, J. L.
4966
ERIKSSON, S.
5203
ERNSTER, V. L.
5296*, 5320*
ESAKI, T.
5219*
ESSEX, M.
5063*
ESTAPE, J.
4851
ESTEL, C.
5272
EVANS, A. E.
5128*
EVANS, J. T.
5308*
EZRIN, C.
5162
FAHRIG, R.
4880
FALK, L.
5014
FALLETTA, J. M.
5148
FALSER, N.
5201
FAN, K. J.
5182
FARBISZEWSKI, R.
4857
FAUST, C. H.
5144*
FAUVE, R. M.
4835
FEE, H. J.
4971
FEINSTEIN, A. R.
5295*
FEINSTEIN, R. N.
4934*
FEKETE, B.
5109
FELSBURG, P. J.
5015
FENOGLIO, C. M.
5214*
FENOGLIO, J. J.
5246*
FERENCZY, A.
4850, 5214*
FERLAZZO, B.
5239*
FERNBACH, D. J.
5148
FERRANDO, R.
4885, 4890
FERRANS, V. J.
5246*
FIALA, E. S.
4940*
FIELDSTEEL, A. H.
4999
FINE, D. L.
5009
FINLAY-JONES, J. J.
5265*
FIRKET, H.
5123*
FISCHER, G. W.
4922
FISCHER, R. G.
4868*
FISCHINGER, P. J.
5059*
FLESHER, J. W.
4935*
FLIEDNER, T. M.
5291
FLINT, S. J.
5085*
FLOERSHEIM, G. L.
5185
FORBES, P. D.
4817
FOSTER, K. J.
5316*
FOWLKES, B. J.
5362*
FRANCESCHI, C.
5105
FRANCK, A.
5146
FRANK, M. M.
5102
FRANK, S.
5176
FRAUMENI, J. F.
5294*, 5304*
FRAZIER, M. E.
4980*
FREEMAN, C. B.
5124*
FREEMAN, R. G.
4864*
FRENKEL, N.
5012
FRIEDELL, G. H.
4892
FRIEDMAN, H.
5108
FRIEDRICHS, K. H.
4931*
FRITSCH, S.
5097
FRY, R. J.
4934*
FUCHS, H. F.
5204
FUCHS, R. P.
4805, 4933*
FUJIMOTO, I.
5314*
FUJINAGA, K.
5023
FUJITA, T.
5359
FUJIWARA, T.
5153
FUKUSHIMA, S.
4919, 4921
FURLONG, N. B.
4906
GACEVIC, M. J.
4977*
GAD, C.
5270
GAERTNER, L.
5018
GAITSKHOKI, V. S.
4897
GAK, J. C.
4885, 4890
GALE, R. P.
5140*
GALLAGHER, C. H.
4907
GALLO, P.
5290
GALLO, R. C.
4865*, 5010

* INDICATES A PLAIN CITATION WITHOUT ACCOMPANYING ABSTRACT

GALLOT, P.
5215*
GALOUX, M.
5004
GANNON, F.
5125*
GARBRECHT, M.
5352
GARDNER, J. W.
5293*
GAURI, K. K.
5384*
GAVRILESCU, C.
5164
GAZDAR, A.
5049*
GEACINTOV, N. E.
4938*
GEDEK, B.
4811
GEDIGK, P.
5192, 5193
GERMAN, J.
5180
GHYSDAEL, J.
5004
GILLEN, L. E.
5234*
GILLESPIE, D.
5010
GILLET, B.
5150
GLORIOSO, J. C.
5095
GOBEEV, V. N.
5334
GODBOLD, J. H.
4959
GOLDBERG, A. R.
5007
GOLDBERG, R. J.
4822
GOLDENBERG, D. M.
5376*
GOLDING, A.
4971
GOLDKNOPF, I. L.
5346
GOLDROSEN, M. H.
5125*
GOLDSTEIN, D. A.
5074*
GOLDSTRAW, P.
5227*
GOMARD, E.
4869*
GONCHAROVA, A. M.
4961
GOOS, M.
5152
GORDIS, L.
5297*
GORMUS, E. J.
5124*
GOSSNER, W.
4962
GRABNER, G.
4878*
GRAFFI, A.
4995, 5209
GRAFFI, I.
4995
GRAILLOT, C.
4885, 4890
GRAVELL, M.
4822
GREEN, I.
5102
GREEN, M.
5023
GREENBERG, G.
4926
GREENBERGER, J. S.
5031
GREENSTOCK, C. L.
4932*
GREENWALD, P.
5301*
GREINER, J. W.
4912
GRIFFITHS, R. S.
4982*
GRINCHISHIN, V. P.
4896
GROSCH-WORNER, I.
5352
GROSA, A. E.
5114*
GROSS, A. E.
5114*
GROSS, R.
5191
GROVER, P. L.
4908
GRUDE, T. H.
5158
GRUNDMANN, E.
4852
GUERIN, M. A.
5390*
GUINAN, P. D.
5141*
GUNZEL, P.
5161
GUREVICH, S. M.
4909
GUTHERT, H.
5207
HAAPALA, D. K.
5059*
HAAS, M.
5051*
HABERSTICH, H. U.
4988
HABIC, M.
5224*
HACKETT, A.
5223*
HACHAZY, G.
5109
HAENSZEL, W.
4841
HAFERKAMP, O.
5149
HAHN, F. F.
4978*
HAIN, E.
4930*
HAIT, W. N.
5389*
HAKALA, T.
5124*
HAKKILUOTO, A.
5233*
HAKOZAKI, H.
5206
HALABAN, R.
5385*
HALL, R. G.
5396*
HALL, T. A.
5259*
HALONEN, P. I.
5244*
HAMBERG, H.
4966
HAMMANN, B.
5150
HAMMERLING, U.
5122*
HANAICHI, T.
5058*
HANANOUCHI, M.
4919, 4921
HANICHEN, T.
4893
HANN, H. L.
5128*
HANSSON, A.
5179
HAREL, L.
5348
HARRELL, E. R.
4871*
HARRIS, C. C.
5225*, 5226*
HARRIS, R.
5145*
HARTWIG, H. G.
5156
HARVEY, J. S.
5015
HARVEY, R. G.
4935*
HARWOOD, S. E.
5131*
HASHIMOTO, K.
5374*, 5388*
HASSENSTEIN, E.
4969
HATASE, O.
5041*
HATTORI, T.
5327*
HAUPTMANN, G.
5150
HAUSEN, P.
5335
HAUSMANN, K.
5352
HAVIG, O.
5238*
HAY, E. D.
5264*

HAY, K. A.
5117*
HAYLES, A. B.
4821
HAYNES, K. F.
5017
HEARING, V. J.
5398*
HEATH, C. W.
4877*
HEBERLING, R. L.
5015
HEBY, C.
5074*
HEIDELBERGER, C.
4904, 4918
HEIDEMAN, R. L.
5148
HEIM, I.
5144*
HEIMANN, P.
5309*
HEIMPEL, H.
5149
HELLER-SCHOCH, G.
5352
HENEEN, W. K.
5179
HENLE, G.
4826
HENLE, W.
4826
HENRY-SUCHET, J.
5175
HERMAN, P. C.
5116*
HERMANEK, P.
5204
HERNALSTEENS, J. P.
4881
HERNDON, J. H.
4864*
HEROLD, H. J.
5267
HERRMANN, K.
5335
HERTZER, N. R.
5302*
HESSELTINE, C. W.
4948*
HEWER, A.
4906
HEYSTRATEN, F. M.
5195
HICKS, P. M.
4956*
HIKINO, M.
5217*
HINUMA, Y.
5026
HINZ, I.
4930*
HIROSE, F.
4967, 5327*
HIROSE, M.
4919, 4921
HIROTA, T.
4920
HIRT, P.
5113*
HIXSON, D. C.
5035*
HOANG-NGOC, M.
5215*
HOBBS, C. H.
4978*
HODGES, G. M.
4956*
HOEKSTRA, J. A.
5060*
HOELZER, D.
5291
HOERR, S. C.
5302*
HOFFENBERG, R.
4982*
HOFFMAN, D. A.
5326*
HOFFMAN, D. R.
5047*
HOFFMANN, L.
5167
HOKANO, M.
5217*
HOLLANDER, C. F.
5183
HOLLARD, D.
4845
HOLLINGSWORTH, J.
4981*
HOLYCKE, E. D.
5125*
HONIG, R.
5126*
HONJO, T.
5100
HOOVER, E. A.
5002, 5063*
HORBACH, L.
5288
HORST-MEYER, H.
5129*
HORVATH, E.
5162
HOSHINO, H.
5000
HOSICK, H. L.
5377*, 5379*
HOUCKE, M.
5208
HOUDENT, C.
5168
HOUGHLAND, A. E.
5068*
HOWARD, P.
4879*
HOWE, S. C.
5099
HOWSON, C. P.
5306*
HSIAO, K. C.
4905
HSU, K. C.
5138*
HU, C.
5119*
HUDSON, T. H.
5386*
HUGHES, L. E.
5139*
HUGUET, C.
5215*
HUHNER, S.
5157
HUMPEL, M.
4917
HUNT, R. G.
5301*
HUNTER, E.
4996
HUNYADI, J.
5104
HURLBURT, W. B.
5294*
HUSZ, S.
5104
HUTCHISON, D. J.
5370*
HUTT, L.
5091*
HYMAN, R.
5093
IANCHEV, V.
5230*
IARC WORKING GROUP
4802, 4804, 4806, 4807,
4808, 4809, 4810
IBRAHIM, A. N.
5088*
IHARA, S.
5042*
IKAWA, Y.
4998
ILLIG, L.
5156
ILYIN, K. V.
5009
INDURUWA, P. A.
5165
INOKUCHI, K.
4916
INOUE, S.
5327*
ISHIHARA, K.
4920
ISHII, H.
5041*
ISHIMARU, S.
5240*
ISSA, A.
5236*
ITO, N.
4919
ITO, T.
4975*
IVANKOVIC, S.
5013
IVANOVIC, V.
4938*
IVERSEN, O. H.
5158
JACKSON, C. H.
5232*
JACOBS, G.
5199

JACOBS, J. B.
4892
JACOBSON, E. L.
5070*
JACOBSON, M. K.
5070*
JAFFE, E. S.
5102
JANERICH, D. T.
5313*
JANUNGER, K. G.
5203
JARVIS, J. E.
5028
JELLINCK, P. H.
5360
JENEY, A.
4987
JENKIN, H. M.
5342
JENTZSCH, F.
4922
JOHNSON, G. F.
5323*
JOHNSON, G. S.
5343
JOHNSON, R. G.
5190
JOHNSTON, J.
5223*
JONES, R. K.
4978*
JORDAN, J. J.
5346
JOSE, D. G.
5129*
JULLIEN, M.
5348
JULLIENNE, A.
5339
JUNG, B.
4966
JUNGI, W. F.
4913
KADIYAN, H.
5230*
KAFATOS, F. C.
5351
KAHAN, B. D.
5235*
KAHN, L. B.
5222*
KALIMA, T.
5233*
KALTER, S. S.
5015
KAMALIAN, L. A.
5020
KAMBE, S.
5251*
KAMEL, M.
5236*
KANAZAWA, T.
5329*
KANO-TANAKA, K.
5058*
KANZAKI, Y.
5041*
KAPLAN, E.
5297*
KAPLAN, M. E.
5124*
KARA, J.
4993
KARASAKI, S.
4891
KARSTEN, U.
5373*
KASANZEWA, V.
4922
KASSIRA, E.
5268
KATOH, Y.
5219*
KATSUKI, T.
5026
KATSURAGI, Y.
5328*
KAUFMAN, H. E.
5022
KAUKER, E.
5352
KAUSHANSKAIA, P. V.
5202
KAW, J. L.
4884
KAWAMURA, Y.
4975*
KEDINGER, C.
5081*
KEITH, L.
4876*
KELLEHER, R. J.
5093
KEMMERER, G.
5204
KERR, S. J.
5386*, 5387*
KESTER, H. C.
4881
KETLINSKII, S. A.
5333
KETTMANN, R.
5004
KHANSON, K. P.
4858
KHOKHLOVA, M. P.
4836
KIM, C. H.
5116*
KING, H. W.
4911
KING, L. E.
5374*, 5388*
KING, L. M.
5231*
KINOSHITA, H.
4919
KIRCHHEIM, E.
4903
KIRCHNER, M.
5146
KIRKPATRICK, C. H.
4833
KIRSTEN, W. H.
5001, 5011
KISSELEV, O. I.
4897
KIVILAAKSO, E.
5233*
KLANJSCEK, G.
5224*
KLAPWIJK, P. M.
4881
KLASEN, H. P.
5147
KLAUBER, M. R.
5293*
KLEIN, D. M.
5390*
KLIMA, W. C.
4954*
KLIMISCH, H. J.
4903
KLINGLER, W. G.
5398*
KMOCH, N.
5276, 5277
KNAP, J.
5154
KNIAZEV, P. G.
4992
KNIKER, W. T.
5015
KNOWLES, S. E.
5347
KNUDSEN, V.
5221*
KOBELE, K.
5291
KOCHHAR, O. S.
5391*
KODAMA, T.
5130*
KOEHLER, B.
5018
KOHLER, G.
5099
KOHLER, P. O.
5364*
KOHRO, T.
5250*
KOJIMA, M.
5206
KOJIMA, S.
4924
KOLLAT, P.
4902
KOLLER, S.
5288
KOMAKI, K.
5248*
KOMURO, M.
4965
KONDO, M.
5153
KOOL, H. J.
4928*
KOPPEL, H.
5069*
KOPPELMANN, L. E.
5067*
KOPYLOV, V. A.
4958

KORN, J.
5091*
KOROBITSYN, L. P.
4992
KOVAC, F.
5159
KOVACS, K.
5162
KOVALSZKY, I.
4987
KOYAMA, Y.
4920
KRAHN, D. F.
4918
KRAMER, R. E.
4912
KRAMMER, P. H.
5115*
KRAUSE, J. R.
5255*
KREIBLICH, H.
5271
KREMLICKA, L.
5242*
KRUG, H.
5170, 5181
KRZEMINSKA-LAWKOWICZOWA, I.
5154
KUBANEK, B.
5149
KUBOTA, A.
5248*
KUCZMARSKI, R.
4981*
KULAKIS, C.
4940*
KUNDEL, H. G.
5142*
KUNG, H. J.
5033
KUNKEL, M.
5018
KUNTZMAN, R.
4905
KUZIN, A. M.
4958
KUZNETSOV, O. K.
4992
KWOLEK, W. F.
4948*
KYLE, J.
5310*
L'HERMINE, C.
5208
LAFONTAINE, N.
5123*
LAGACHE, G.
5208
LAJTHA, L. G.
4894
LAKSHMINARAYAN, S.
4942*
LAM, K. M.
5119*
LAMAZE, R.
5216*
LAMB, C.
5227*
LAMPEN, N.
5260*
LANDBECK, G.
5352
LANE, P. E.
5031
LANG, J. M.
5150
LANGE, C. E.
5192
LANGE, P.
5124*
LANGER, F.
5114*
LANIER, A.
5294*
LAPIDUS, S. M.
4968
LAPIS, K.
4987
LAPKIN, V. Z.
4909
LAQUEUR, G. L.
5183
LARSEN, T. E.
5158
LASKEY, J. W.
4959
LAUSCH, R. N.
5117*
LAVI, S.
5012
LAWKOWICZ, W.
5154
LAWLER, S. D.
4874*
LAWRENCE, A. M.
4983*
LECAM, L.
5223*
LECLERC, J. C.
4869*
LECLERCQ, M.
5004
LECLERE, J.
5216*
LEDBETTER, M. L.
5400*
LEDER, P.
5100
LEDERER, B.
5201
LEE, B. K.
5065*
LEE, R. E.
5255*
LEFEBVRE, P. A.
5007
LEFEVRE, J. F.
4933*
LEFFINGWELL, T. P.
5050*
LEIS, H. P.
4828
LELBACH, W. K.
5192, 5193
LEMBACH, K. J.
5381*
LEMMI, C. A.
5067*
LEMONS, R.
5049*
LENNERT, K.
5152
LEVIN, A.
5223*
LEVINE, G. A.
5371*
LEVY, J. P.
4869*
LEVY, S.
5349
LEVY, S. B.
5046*
LEYMASTER, C. E.
5330*
LEZANA, M. E.
5365*
LI, J. L.
5089*
LI, L. H.
4918
LIANG, W.
5094
LIAO, S. K.
5134*
LIARSKII, P. P.
4961
LIBBEY, L. M.
4953*
LILLEHOJ, E. B.
4948*
LILLY, F.
5043*
LINDENBAUM, A.
4960
LINDSTROM, D. M.
5372*
LINNA, T. J.
5119*
LISIEWICZ, J.
4947*
LITTLE, J. B.
4866*
LIU, M.
5138*
LIU, S. K.
5323*
LOIZZI, R. F.
5390*
LOMSADZE, B. A.
4901
LONI, M. C.
5023
LOSKANT, H.
5288
LOUB, W. D.
4905
LUBIN, M.
5400*
LUCAS-LENARD, J.
5030
LUDECKE, D.
5163
LUECKE, D. H.
4868*

LUFTIG, R. B.
5048*
LUISA CRISTINA, M.
5212*
LUMLEY, K. P.
5286
LUND, J. F.
4980*
LUSHBAUGH, C. C.
5228*
LUZ, A.
4962
LYON, J. L.
5293*, 5330*
LYTLE, C. D.
5017
LYTTLE, C. R.
5360
MACDONALD, W. C.
4955*
MACGREGOR, J. T.
4883
MACLENNAN, R.
4843
MACNAMARA, J.
5134*
MACNAUGHTON, M. R.
5006
MADGE, G. E.
5237*
MAENZA, R. M.
4927
MAGNUS, K.
5158
MAGUN, B.
5040*
MAIZEL, J. V.
5084*
MAKHMURIAN, T. D.
5020
MAKK, L.
5284
MAL'TSEVA, M. M.
4961
MALDAGUE, P.
4846
MALDONADO, J. E.
5253*
MALICK, L.
4915
MAMMERICK, M.
5004
MANDEL, S. A.
5296*
MANGALIK, A.
5298*
MANIATIS, T.
5351
MANILOFF, J.
5029
MANZ, A.
5283
MARCUS, S. L.
5064*
MARKOE, A. M.
5353
MARKOVIC, Z.
5188
MARQUART, K. H.
4962
MARQUEZ, E. D.
5087*
MARSTELLER, H. J.
5192, 5193
MARTI, J.
5141*
MARTON, L. J.
5074*
MARUSIC, M.
5120*
MARUTA, Y.
5250*
MARUYAMA, K.
5035*
MASON, T. J.
5304*
MASUBUCHI, K.
5314*
MASUBUCHI, S.
5314*
MATHES, L. E.
5063*
MATSUNAGA, E.
5243*
MATZKER, J.
5147
MAURER, H. R.
4856
MAXAM, A. M.
5351
MAYER, G.
5150
MAYOR, H. D.
5080*
MCALLISTER, H. A.
5246*
MCALLISTER, R. M.
5033
MCCANN, J.
4814
MCCLUNG, H.
5019
MCCONAHEY, W. M.
4821
MCCORMACK, R. J.
5227*
MCCULLOCH, P. B.
5134*
MCDOUGALL, J. K.
5079*
MCDOWELL, E. M.
5225*, 5226*
MCKHANN, C. F.
5118*
MCLACHLAN, J. A.
4945*
MCMICHAEL, A. J.
4981*
MCNABB, T.
5360
MEEKER, W. R.
5308*
MEGAW, J.
5088*
MEHNERT, W. H.
5209
MEISSNER, W. A.
5311*
MEISTER, A.
5356
MELCHER, T.
5178
MELKUMOVA, M. A.
5020
MELLINS, H. Z.
5116*
MERTELSMANN, R.
5352
METCALFE, J. B.
4925
MEWISSEN, D. J.
4972*, 4973*
MILHAUD, G.
5339
MILLER, J. M.
5003, 5005
MILLER, M. F.
5035*
MILLER, R.
4840
MILLER, S. C.
5264*
MILNE, J. H.
5285
MILSTEIN, C.
5099
MINATO, T.
5245*, 5251*
MINNA, J.
5049*
MINOWADA, J.
5096
MITANI, S.
5251*
MITTELMAN, A.
5308*
MIURA, K.
5344
MIYAKE, Y.
5328*, 5329*
MIYAZAKI, N.
5240*
MOBARHAN, S.
5315*
MODAK, M. J.
5064*
MODIC, S.
5224*
MOHR, U.
5276, 5277
MOLDOW, C. F.
5263*
MOLINA, C.
5189
MOLLER, W.
5156
MONDAL, S.
4904
MONGET, D.
5354
MONSON, R. R.
4986*
MONTAGUE, P. M.
5396*

MONTAUT, J.
5216*
MOORE, D. H.
5066*
MOORE, T. C.
5067*
MOORE T. C.
5067*
MOCRO, H.
5236*
MOPERT, S.
5129*
MORGAN, L. R.
5234*
MORONI, C.
4997
MORRIS, H. P.
4934*
MORSON, B.
5198
MORTAZAVI, H.
5315*
MORTON, J. H.
5196
MOSCHINSKI, D.
5199
MOSKOWITZ, M.
5380*
MOUKHTAR, M. S.
5339
MOVSESIAN, E. A.
5020
MUGGENBURG, B. A.
4978*
MUKAI, N.
5024, 5083*
MULLER, K. T.
5191
MULLER, R.
5192, 5193
MUNRO, A.
5310*
MUNSON, B. R.
5044*
MURAO, T.
5083*
MURASKO, L. M.
5117*
MURAV'EV, G. N.
5171
MUTO, T.
5250*
MYERS, L. S.
4819
NACKARNI, G. B.
5355
NAGAO, K.
4975*
NAGAO, M.
4951*
NAGASAWA, H.
4910
NAHMIAS, A. J.
5088*
NAHRIG, G.
5129*
NAKAGAKI, S.
5344
NAKAI, G. S.
5397*
NAKAI, K.
5030
NAKANO, K.
5205
NAKAZAWA, S.
5096
NARDON, P.
5354
NASO, R. B.
5059*
NASS, M. M.
5036*
NEFF, N.
5054*
NEKI, M.
5153
NELSON, J. S. R.
5353
NELSON, K. W.
4813
NEMOTO, H.
5314*
NEPPERT, J.
5167
NESBIT, R. R.
5196
NETH, R.
5352
NEUBAUER, R. H.
5016
NEUKOMM, S.
5287
NEUPERT, G.
5373*
NUEPERT, G.
5373*
NEWILL, V. A.
5289
NICOLSON, M. O.
5033
NIENHAUS, H.
4852
NIEZABITOWSKI, A.
4995
NIIMOTO, M.
5327*
NILSSON, K.
5112
NISHIMURA, H.
5359
NOLA, E.
5361
NOMAGUCHI, H.
5042*
NOMOTO, K.
4916
NOMURA, T.
4941*
NOONAN, K. D.
5338
NOORBIBI DAY, K.
5142*
NOOTER, K.
5032
NORIO, R.
5244*
NORTH, L. B.
4937*
NOVAK, L.
4974*
NOVOGRODSKY, A.
5356
NUSSLIN, F.
4969
O'CONNELL, T. X.
4971
O'KEEFE, D. E.
5129*
OBERENDER, H.
5018
OBERLING, F.
5150
ODA, T.
5041*
OETTGEN, H. F.
5122*
OGINO, Y.
5245*
OHANIAN, S. H.
5133*
OHTA, Y.
4886
OISHI, S.
5153
OKA, K.
5206
OKADA, S.
5248*, 5363*
OKAMOTO, Y.
5359
OKROS, I.
5184
OKULOV, V. B.
5333
OLASON, D.
4389
OLD, L. J.
5122*
OLSEN, R. G.
5002, 5063*
OMORI, K.
4920
OOKA, M. P.
4949*
OOTA, K.
4844
ORENSTEIN, J. M.
5210
ORWELL, R. L.
5229*
OSADCHII, P. A.
5202
OSBORNE, M. R.
4911
OSENHOLTS, M.
5012
OSIPOVA, I. N.
4958
OSIPOVA, L. C.
4896
OSKARSSON, M. K.
5059*
OTH, D.
4830

OTSUKA, H.
5380*
OTTO, F.
5279
OUTZEN, H. C.
4900
OVE, P.
5383*
OWADA, M.
5042*
PACKMAN, S.
5100
PAGANO, J.
5091*
PAL, K.
4908
PALOYAN, E.
4983*
PANEM, S.
5001, 5011
PANOV, D.
4974*
PANTUCK, E. J.
4905
PAOLUCCI, P.
5105
PARENT, L.
5268
PARIS, J.
5208
PARKER, S.
5261*
PARMLEY, R. T.
5258*
PAROLA, A.
5375*
PASKIND, M. P.
5048*
PASTOR, K. M.
4899
PATAKI, J.
4935*
PATEL, N.
5108
PATNAIK, A. K.
5323*
PAUL, E.
5156
PAVIA, R. A.
5376*
PAVLOVSKAIA, N. A.
4961
PAWELEK, J.
5385*
PAWSE, A. R.
5355
PAYET, M.
4812
PAYNE, L. N.
5107
PEILLON, F.
5168
PENNING, W.
5176
PERAINO, C.
4934*
PERATT, S.
4907
PERERA, M.
5165
PEREVOZCHIKOV, A. P.
4992
PERIMAN, P. O.
5121*
PERLIN, E.
5121*
PEROCCO, P.
5105
PETERS, R. L.
5305*
PETERSON, A. R.
4918
PETERSON, H.
4918
PETERSON, H. I.
5211
PETERSON, P.
5126*
PETERSON, R. E.
4948*
PETERSON, R. H.
5395*
PETIT, R.
5189
PETTY, T. L.
4942*
PETZELT, G.
5399*
PEUGNET, J. P.
5168
PFENNINGER, E.
5279
PHILIPP, E.
5169
PHILLIPS, S. M.
5031
PICKLEMAN, J. R.
4983*
PIERCE, J. C.
5237*
PILLIAERT, J. M.
5218*
PINTO, S. S.
4813
PIPER, C. W.
5229*
PIQUET, J. J.
5218*
PLA, D.
5260*
PLAMENAC, P.
5188
PLESNICAR, S.
5224*
PLOUFFE, J.
5299*
POLIAKOV, V. M.
4909
POLLIACK, A.
5259*
PORTER, D. D.
5067*
PORTETELLE, D.
5004
PORTNOI, L. M.
5202
PORVAZNIK, M. M.
5190
POSEY, L. E.
5234*
POUR, P.
5276, 5277
POUYET, J.
4933*
POWELL, P. C.
4989
POZHARISSKI, K. M.
4897
PRASAD, I.
5076*
PRASAD, K. N.
5392*
PRASAD, N.
4937*
PRASAD, R.
4937*
PREGAGLIA, G. F.
4860*
PREHN, R. T.
4900
PRESANT, C. A.
5261*
PRESTON, R. J.
4862*
PREUD'HOMME, J. L.
5101
PREUSSMANN, R.
4895
PRICE, G. B.
5254*, 5367*
PRINGGOUTOMO, S.
4838
PRINZ, R.
4983*
PRIORI, E. S.
5009
PROCHOWNIK, E. V.
5011
PRODI, G.
5105
PROUDFIT, C. M.
4855
PUCA, G. A.
5361
PULHORN, G.
5152
PURTILO, D. T.
5194
QUIGLEY, J. P.
5038*
QUINTANA, M.
5189
RABIN, B. S.
5255*
RABIN, H.
5016
RABUKHIN, A. E.
5278
RADASZKIEWICZ, T.
5152
RAHA, C. R.
4907
RAPP, F.
5087*, 5089*

* INDICATES A PLAIN CITATION WITHOUT ACCOMPANYING ABSTRACT

RASO, A. M.
5249*
RAULAIS, D.
5339
RAWLS, W. E.
5019
RAY, M.
5088*
READING, J. C.
4942*
REBHUN, L. I.
5391*
REED, W. B.
4847
REHACEK, J.
4868*
REHDER, H.
5178
REICH, E.
4991, 4994
REISSIGL, H.
5201
RENNERT, O. M.
5368*
RENNIE, M.
5107
REUBER, M. D.
4888
REWCASTLE, B.
5162
RHODES, C.
5008
RICHART, R. M.
5214*
RICKINSON, A. B.
5028
RIDWAY, J. C.
5145*
RIEBER, E. P.
5137*
RIESNER, K.
5186
RIETHMULLER, G.
5137*
RIFKIN, D. B.
4991, 4994, 5394*
RIGBY, P. W.
5008
RIMOIN, D.
5252*
RIOS, F.
5141*
RISBERG, B.
5211
ROBERTS, G. P.
5139*
ROBERTS, R. M.
5338
ROBEY, W. G.
5059*
ROBINSON, C. A.
4912
ROBINSON, W. A.
5298*
ROCHE, G.
5189
ROENSPIES, U.
5279
ROESCH, W.
5197
ROHRLICH, S. T.
5394*
ROKHLIN, E. A.
5202
ROMANOVICH, E. A.
5345
ROSCH, W.
5204
ROSE, J. S.
5301*
ROSEMAN, S.
4879*
ROSENBERG, H. S.
5148
ROSENBUSCH, G.
5195
ROSENTHAL, S.
5375*
ROSLI, R.
4913
RUSS, J.
5350
ROSS, P.
5054*
ROSS, R. K.
5307*
ROUBKOVA, H.
5242*
ROYSTON, I.
5121*
ROZENBLATT, S.
5012
RUBENSTEIN, C. B.
5046*
RUBIN, H.
4990
RUDDOCK, G. W.
4932*
RUDIGER, K. D.
5207
RUMPF, P.
5199
RUSSELL, E.
5049*
RUSSU, I. D.
5166
RUST, J. H.
4972*, 4973*
RUTKE, J.
5176
RUTZKY, L. P.
5235*
SAAL, J. G.
5137*
SACKS, L. E.
4883
SACKS, S. T.
5296*, 5320*
SADE, J.
5332
SAEGER, W.
5163
SAHAI, A.
5266*
SAHU, S. K.
5392*
SAITO, M.
4998
SAITO, T.
4916
SAKAI, K.
4924
SAKASHITA, A.
5250*
SALMON, D.
5216*
SANCHEZ, S. N.
5241*
SANDELIN, K.
5039*
SANDER, J.
4902
SANDHOFER, M.
5159
SANDMIRE, H. F.
5177
SANKARAN, K.
5355
SANO, M.
5250*
SANO, R.
4920
SARKAR, N. H.
5064*
SARUHASHI, K.
5329*
SASSA, H.
5217*
SATO, E.
5344
SATO, T.
5225*
SATTERFIELD, L. C.
4954*
SAUER, G.
5013
SAUK, J. J.
5387*
SAUTNER, D.
5350
SAVOST'IANOV, G. A.
4992
SCANLAN, R. A.
4953*
SCHAFFER, P.
5014
SCHALLER, J. P.
5002, 5063*
SCHELL, J.
4881
SCHICKE, B.
5129*
SCHIFFER, L. M.
5353
SCHILLINGS, P. H.
5195
SCHILPEROORT, R. A.
4881
SCHLAGER, S. I.
5133*
SCHLIPKOTER, H. W.
4931*
SCHMID, F. R.
4923

SCHMINCKE, C. D.
5335
SCHNEIDER, E. L.
5362*
SCHNEIDER, P.
5322*
SCHNEIDERS, F.
4995
SCHOCH, G.
5352
SCHOENBERG, B. S.
5318*
SCHOENGEN, A.
5149
SCHRAMM, T.
4803, 4995
SCHRAUZER, G. N.
5331*
SCHUBERT, G. E.
4849
SCHUMANN, G.
4997
SCHUSSLER, J.
5173, 5174
SCHWAMBERGER, K.
5201
SCHWARTZ, J. P.
5343
SCHWARTZ, R.
5299*, 5300*
SCHWARZE, E. W.
5152
SCHWEINSBERG, E.
4902
SCHWEINSBERG, F.
4902
SEBATA, K.
5153
SEDGWICK, C. E.
5311*
SEIBERT, H.
5396*
SEITS, I. F.
4992
SELAK, I.
5188
SELIGMANN, M.
5101
SELVIN, S.
5296*, 5320*
SENEZE, J.
5175
SENIK, A.
4869*
SENN, H. J.
4913
SENN, J. S.
5254*, 5367*
SENNING, A.
5279
SETH, P.
5019
SETHI, V. S.
5034
SHADDUCK, R. K.
5255*
SHAH, H. C.
4945*

SHALUMOVICH, W. N.
4897
SHAMOTO, M.
5344
SHANMUGARATNAM, K.
5292*
SHAPIRO, R.
4815
SHAPOSHNIKOV, J. D.
4897
SHARP, B.
4872*
SHARP, P. A.
5085*
SHAW, M. W.
4873*
SHEARER, C. M.
5136*
SHEARER, W. T.
5132*, 5135*, 5136*, 5143*
SHEFFIELD, J. B.
5066*
SHELDRICK, P.
5086*
SHELTON, E.
5210
SHENK, T. E.
5008
SHEPPARD, J. R.
5386*, 5387*
SHEPS, S. G.
5160
SHERIDAN, J. D.
5190
SHERIDAN, J. W.
5265*
SHIBATA, J.
5245*
SHIGEMATSU, N.
5240*
SHIKU, H.
5122*
SHIMIZU, H.
4915, 4951*
SHIRAI, T.
4921
SHIRAKUSA, T.
5240*
SHOPE, T. C.
5025
SHORE, B.
4828
SHOTWELL, O. L.
4948*
SHUBIK, P.
4907
SHVEMBERGER, I. N.
4898
SICA, V.
5361
SICILIANO, M. J.
5364*
SILAGI, S.
5384*
SILTANEN, P.
5244*
SILVA, J.
5299*, 5300*

SILVERSTONE, S. M.
4976*
SIMAR, L.
4979*
SIMON, M. L.
5368*
SIMON, N.
4976*, 5104
SIMS, P.
4908
SINGH, J.
4884
SINHA, P. K.
5392*
SINKS, L. F.
5096
SIPPONEN, P.
5233*
SIREK, A. M.
5162
SIZEMORE, G. W.
5160, 5232*
SKEGG, D.
5274
SKRANDIES, G.
5352
SKUL'SKAIA, S. F.
5166
SKURDAL, D.
5047*
SLOWIK, F.
5184
SMADJA, A.
5215*
SMART, C. R.
5293*
SMITH, B. A.
5341
SMITH, G. H.
5065*
SMITH, J. W.
5095
SMITH, L. H.
4853
SMITH, S. A.
5220*
SMITH, T. J.
4942*, 5330*
SMITH, W. I.
5255*
SNELL, K. C.
5183
SOBUE, M.
5219*, 5344
SOEDIGDO, S.
4935*
SOGA, J.
5250*
SOLOMON, S. S.
5374*, 5388*
SOMES, G.
5308*
SONSTEGARD, R.
5321*
SPECTOR, S.
5108
SPICER, S. S.
5258*

SPINDLE, A. I.
5052*
STACKPOLE, C. W.
5053*
STAFFORD, J. E.
5017
STANECZEK, W.
5267
STANISIC, M.
4913
STARLING, K.A.
5148
STASZEWSKI, J.
4842
STAVROU, D.
4893
STAWISKI, M.
4871*
STECH, D.
5272
STECK, F.
4988
STEEVES, R. A.
5043*
STEIN, G. S.
5368*
STEINBACH, K. H.
5291
STEINER, S.
5055*
STELTER, U.
5213*
STEPHENSON, J. R.
5031
STEPS, H.
5172
STEUBER, C. P.
5148
STEVENS, J. G.
4867*
STORB, R.
5111
STORTENBEEK, A. J.
4818
STOTSKY, M.
4876*
STRAFUSS, A. C.
5324*, 5325*
STRAND, M.
5071*
STYLES, J. A.
4952*
STYLIANOS, S. K.
5114*
SUECKA, N.
5372*
SUGIMURA, T.
4951*
SUHARA, G.
5041*
SULLIVAN, J. L.
5121*
SULSER, H.
5200
SUNDERMAN, F. W.
4927
SUZUKI, M.
5363*
SUZUKI, S.
5245*
SWAN, D.
5100
SWARTZENDRUBER, D. C.
5228*
SWEENEY, W. T.
5237*
SZABO, B.
5109
SZABO, G.
5109
SZKLO, M.
5297*
TABATADZE, L. G.
4901
TABOULET, J.
5339
TAKAHASHI, K.
5206
TAKAHASHI, M.
4919, 4921, 5359
TAKAHASHI, T.
5122*
TAKEICHI, N.
4967, 5327*
TAKEMOTO, K. K.
4827
TAKEMURA, N.
4951*
TAKEUCHI, J.
5219*, 5344
TAKEWAKI, K.
4886
TAKIZAWA, S.
4967
TALA, P.
5244*
TAMADA, R.
4916
TANAKA, T.
5058*
TANIGUCHI, H.
4910
TAO, T. W.
5185
TARABUTA-CORDUN, G.
5164
TARASCHI, N.
5066*
TASCA, R. J.
5052*
TASHJIAN, A. H.
5232*
TATE, S. S.
5356
TATEMATSU, M.
4919, 4921
TATTER, D.
5305*
TAVASSOLI, M.
5046*
TAWARA, J.
5037*
TAYLOR, C. R.
5151
TAYLOR, C. W.
5346
TAYLOR, G. M.
5145*
TAZAWA, K.
5250*
TEASDALE, C.
5139*
TEICHMANN, B.
4803
TENG, C. S.
4944*
TENG, C. T.
4944*
TERASAKI, P. I.
5126*
TERJESEN, T.
5303*
TESAR, J. T.
4923
TESHIMA, H.
5142*
TEVETHIA, M. J.
5072*
TEVETHIA, S. S.
5072*
THATCHER, J.
5139*
THEOHARIDES, T. C.
5357
THOMAS, F. B.
4906
THOMAS, K.
5092
THOMPSON, E. B.
5056*
THOMPSON, M. H.
4911
THORBJARNARSON, B.
5247*
THUST, R.
5373*
TIGANO, F.
5239*
TINCKLER, L. F.
5310*
TOBEN, H.
5106
TODA, K.
5251*
TOM, B. H.
5235*
TOMA, V. A.
5262*
TOMPKINS, E. A.
4959
TONASCIA, J. A.
5297*
TOOHEY, J. I.
5336
TORHORST, J.
5185
TOTH, B.
4915
TOYOSHIMA, K.
5042*
TRUHAUT, R.
4885, 4890
TRUJILLO, J. M.
5257*

TRUMP, B. F.
5225*, 5226*
TRUMPER, P. A.
5090*
TSAKTSIDZE, M. A.
4901
TSOI, M. S.
5111
TSUBOUCHI, S.
4970
TSYGAN, V. M.
5166
TUSCHL, H.
5159
TUUTERI, L.
5244*
UCHINO, S.
5314*
UEBA, C.
5037*
UEDA, N.
5248*
ULRICH. B.
5199
UNO, F.
5037*
UPITER, M. Z.
5276
URBACH, F.
4817
UROVITZ, E. P.
5114*
URQUHART, C.
5069*
USIZIMA, H.
5219*
UTSINGER, P.
5091*
V. HEYDEN, H. W.
5137*
VAHOUNY, G.
5268
VAN BOGAERT, L. J.
4846
VAN DER MAATEN, M. J.
5003, 5005
VAN DUUREN, B. L.
4887
VAN HAAFTEN, C.
5225*
VAN PELT, F. G.
5032
VAN VEEN, J.
5338
VANDAM, H.
4818
VARAKIS, J. N.
5078*
VARGHESE, A. J.
4816
VASIL'EVA, G. S.
5110
VELEV, G.
5230*
VERMA, I. M.
4996
VERWOERD, D. W.
5062*
VIDAL RIOJA, L. A.
5365*
VILLEE, C. A.
4859*
VISNJIC, V.
4974*
VISWANATHAN, P. N.
4884
VOGT, P. K.
5033
VOKAER, A.
4820
VOLOCH, Z.
5349
VOORHEES, J. J.
4871*
VU DUC, T.
5287
WALBAUM, P. R.
5227*
WALKER, W. S.
5098
WALLEN, W. C.
5016
WALLER, H. D.
5137*
WALLING, M. J.
5138*
WALTHER, B.
4879*
WANG, J. L.
4831
WARD, J. M.
4959
WARE, B. F.
5341
WARNER, M. R.
5275
WARTHESEN, J. J.
4953*
WASTESON, A.
5337
WATANABE, H.
4967
WATSON, J. A.
5358
WATTENBERG, L. W.
4905
WEBBER, M. M.
5021
WEBER, M. J.
5378*
WECHSLER, W.
5131*
WEE, A.
5292*
WEHLER, V.
5173, 5174
WEIDEN, P. L.
5111
WEINBERG, R. A.
5048*
WEINER, R. S.
5341
WEINSTEIN, I. B.
4938*
WEISBURGER, J. H.
4940*
WEISMAN, Z.
5332
WEISS, B.
5389*
WEISSENBACHER, E. R.
5176
WELLS, C. K.
5295*
WENNERSTROM, D. E.
5342
WERNET, P.
4870*
WESTERMARK, B.
5337
WESTPHAL, H.
4823
WETZEL, B.
4879*
WHALEY, W. G.
5050*
WHISNANT, J. P.
5318*
WHITE, G.
5274
WHITEHEAD, R. H.
5139*
WHITESIDE, T. L.
5255*
WHORWELL, P. J.
5316*
WHUR, P.
5069*
WICKRAMASINGHE, R. H.
4859*
WICKRAMASINGHE, S. N.
5340
WILD, D.
4801
WILD, J. R.
4882
WILDNER, G. P.
4914
WILHELM, J.
5081*
WILKE, R. N.
4935*
WILLIAMS, D. C.
5069*
WILSON, B. R.
5127*
WILSON, F. C.
5129*
WINKELSTEIN, A.
5255*
WINKELSTEIN, W.
5296*, 5320*
WINOCOUR, E.
5012
WISEMAN, L. L.
5367*
WITTIG, G.
4914
WITWER, M. W.
4923
WOCKEL, W.
5207
WOLF, B. A.
5007

WOLF, H.
5027
WOLF, L. M.
5168
WOLFE, L.
5014
WOLLWEBER, L.
5097
WONG-STAAL, F.
5010
WOOLLAMS, R.
5229*
WOROWSKI, K.
4857
WOUDE, G. F.
5059*
WRIEDT-LUBBE, I.
4893
WRIGHT, J.
5014, 5073*
WRIGHT, J. F.
4959
WRIGHT, N. J.
5258*
WRIGHT, R.
5316*
WRIGLEY, D.
5128*
YAHAGI, T.
4951*
YAMADA, S.
4970
YAMAMOTO, T.
5000
YAMANE, Y.
4924
YAMASHITA, T.
5023
YANAI, F.
4910
YANG, S. S.
5056*
YANYSHEVA, N. Y.
4929*
YAROM, R.
5259*
YEOMAN, L. C.
5346
YOHN, D. S.
5002, 5063*
YOKORO, K.
4975*
YOSHIDA, M.
5042*, 5219*
YOSHIDA, S.
4921
YOSHIDA, T.
5240*
YOSIDA, T. H.
5369*
YOUNG, J. F.
5080*
YOUNT, W.
5091*
YU, S.
5118*
YUNIS, E. J.
5263*
ZACHARCHUK, C. M.
5066*
ZACHRAU, R. E.
4828
ZAHN, U.
5169
ZAHRAN, M. M.
5236*
ZAIDI, S. H.
4884
ZEIGLER, Z. R.
5255*
ZEUTHEN, J.
5112
ZHUDINA, A. I.
4992
ZHUK, V. I.
5202
ZIDAR, B. L.
5255*
ZIGHELBOIM, J.
5140*
ZINSER, H. K.
5172
ZONANA, J.
5252*
ZOUZIAS, D.
5076*
ZU RHEIN, G. M.
5078*
ZUCKERMAN, S. H.
4949*
ZUR HAUSEN, H.
5027

ABNORMALITIES
- NEOPLASMS
  - EPIDEMIOLOGY, 5313*
  - NERVOUS SYSTEM, 5313*

ABNORMALITIES, DRUG INDUCED
- AFLATOXIN B1
  - SELENIOUS ACID, DISODIUM SALT, 4947*

ACENAPHTHENE, 5-NITRO-
- SALMONELLA TYPHIMURIUM
  - CARCINOGENIC METABOLITE, 4951*
  - MUTAGENIC ACTIVITY, 4951*

ACETAMIDE
- DNA
  - CELL NUCLEUS, 4889
  - CELL TRANSFORMATION, NEOPLASTIC, 4889
- RNA
  - CELL NUCLEUS, 4889
  - CELL TRANSFORMATION, NEOPLASTIC, 4889

ACETAMIDE, N-(ACETYLOXY)-N-9H-FLUOREN-2-YL-
- DNA
  - FLUORENE RING, ORIENTATION, 4933*

ACETAMIDE, N-FLUOREN-2-YL-
- DNA
  - BINDING, 4932*
  - CARCINOGENIC ACTIVITY, REVIEW, 4805
  - CARCINOGENIC METABOLITE, 4932*
- HEPATOMA
  - CARCINOGENIC ACTIVITY, RAT, 4888
  - GENETICS, 4888
- LIVER CIRRHOSIS
  - GENETICS, 4888
- LIVER NEOPLASMS
  - ALDEHYDE OXIDOREDUCTASES, 4934*

ACETAMIDE, N-FLUOREN-2-YL-7-IODO-
- DNA
  - CARCINOGENIC ACTIVITY, REVIEW, 4805

ACETAMIDE, N-FLUOREN-2-YLDI-
- HEPATOMA
  - CARCINOGENIC ACTIVITY, RAT, 4888
  - GENETICS, 4888
- LIVER CIRRHOSIS
  - GENETICS, 4888

ACETAMIDE, THIO-
- DNA
  - CELL NUCLEUS, 4889
  - CELL TRANSFORMATION, NEOPLASTIC, 4889
- RNA
  - CELL NUCLEUS, 4889
  - CELL TRANSFORMATION, NEOPLASTIC, 4889

ACETIC ACID
- ERYTHROLEUKEMIA
  - CELL DIFFERENTIATION, 4998
  - HEMOGLOBINS, 4998

ACETIC ACID, COPPER(2+) SALT
- BUTYRIC ACID, 2-AMINO-4-(ETHYLTHIO)-
  - RNA, TRANSFER, 4924
- RNA, TRANSFER
  - LEUCINE, 4924
  - LIVER, RAT, 4924

P-ACETOPHENETIDIDE
- VEGETABLES
  - METABOLISM, RAT, 4905

ACETYLAMINOFLUORENE
- SEE ACETAMIDE, N-FLUOREN-2-YL-

ACHOLEPLASMA LAIDLAWII
- VIRUS, MYCOPLASMA
  - RIFAMPICIN, 5029

ACID PHOSPHATASE
- LEUKEMIA, HAIRY CELL
  - LYMPHOCYTES, 5255*

ACRIDINE, 3,6-DIAMINO-
- VIRUS, HERPES SIMPLEX 2
  - CELL TRANSFORMATION, NEOPLASTIC, 5089*
  - LIGHT, 5089*
  - RADIATION, NON-IONIZING, 5089*

ACTINOMYCIN
- VIRUS, ROUS SARCOMA
  - PEPTIDE HYDROLASES, 4991

ACTINOMYCIN C
- LEUKEMIA, MYELOCYTIC
  - INTERFERON, 5109

ACTINOMYCIN D
- GLYCOPEPTIDES
  - CELL TRANSFORMATION, NEOPLASTIC, 5395*
- LEUKEMIA L1210
  - CELL MEMBRANE, 5370*
  - ULTRASTRUCTURAL STUDY, 5370*
- NEUROBLASTOMA
  - ADENOSINE CYCLIC 3',5' MONOPHOSPHATE, 5392*
- VIRUS, KIRSTEN MURINE SARCOMA-LEUKEMIA
  - VIRUS REPLICATION, 5001
- VIRUS, MOLONEY MURINE LEUKEMIA
  - VIRUS REPLICATION, 5048*
- VIRUS, POLYOMA
  - CARBOXY-LYASES, 5074*
  - RNA REPLICATION, 5074*

ADENINE NUCLEOTIDES
- CARBOHYDRATES
  - CELL TRANSFORMATION, NEOPLASTIC, 5343
  - FIBROBLASTS, 5343

ADENOCARCINOMA
- BRONCHIAL NEOPLASMS
  - CILIA, 5226*
- CELL MEMBRANE
  - ULTRASTRUCTURAL STUDY, 5264*
- COLONIC NEOPLASMS

    - GENETICS, 5199
    - HYDRAZINE, 1,2-DIMETHYL-, 4914
    - INTESTINAL POLYPS, 5199
    - MICROVILLI, 5228*
    - PRECANCEROUS CONDITIONS, 5199
  - DIAPHRAGMATIC HERNIA
    - CASE REPORT, 5247*
  - GYNECOLOGIC NEOPLASMS
    - ULTRASTRUCTURAL STUDY, REVIEW, 4850
  - HISTOCOMPATIBILITY ANTIGENS
    - CELL MEMBRANE, 5264*
  - INTESTINAL NEOPLASMS
    - CASE REPORT, 5196
    - EPIDEMIOLOGY, CAT, 5323*
    - GENETICS, 5199
    - HISTOLOGICAL STUDY, CAT, 5323*
    - HYDRAZINE, 1,2-DIMETHYL-, DIHYDROCHLORIDE, 4915
    - INTESTINAL POLYPS, 5199
    - PRECANCEROUS CONDITIONS, 5199
  - KIDNEY NEOPLASMS
    - BLOCKING FACTOR, 5141*
    - EPIDEMIOLOGY, GERMANY, 5207
    - UREA, ETHYL NITROSO-, 4893
  - LIVER NEOPLASMS
    - TRANSPLANTATION, HOMOLOGOUS, 4898
  - LUNG NEOPLASMS
    - HISTOLOGICAL STUDY, PERIFOCAL INFLAMMATION, 5187
    - STERIGMATOCYSTIN, 4802
  - MAMMARY NEOPLASMS, EXPERIMENTAL
    - CONTACT INHIBITION, 5377*
  - PROSTATIC NEOPLASMS
    - BLOCKING FACTOR, 5141*
    - RADIATION INJURIES, EXPERIMENTAL, 4967
    - RADIATION, IONIZING, 4967
  - RECTAL NEOPLASMS
    - HYDRAZINE, 1,2-DIMETHYL-, DIHYDROCHLORIDE, 4915
  - STOMACH NEOPLASMS
    - ALKALINE PHOSPHATASE, 5359
    - CASE REPORT, MENETRIER'S DISEASE, 5204
    - EPIDEMIOLOGY, EAST GERMANY, 5267
    - FETAL GLOBULINS, 5359
    - GUANIDINE, 1-ETHYL-3-NITRO-1-NITROSO-, 4919
    - GUANIDINE, 1-METHYL-3-NITRO-1-NITROSO-, 4921
    - QUINOLINE, 4-NITRO-, 1-OXIDE, 4919
  - THYROID NEOPLASMS
    - DIAGNOSIS AND TREATMENT, 5309*
    - EPIDEMIOLOGY, 5311*
    - EPIDEMIOLOGY, SCANDINAVIA, 5309*

- ADENOCARCINOMA, PAPILLARY
  - INTESTINAL NEOPLASMS
    - EPIDEMIOLOGY, CAT, 5323*

- ADENOFIBROMA
  - BREAST NEOPLASMS
    - CHONDROITIN, 5344
    - HYALURONIC ACID, 5344
  - MAMMARY NEOPLASMS, EXPERIMENTAL
    - TRITIUM, 4959

- ADENOIDS
  - CELLS, CULTURED
    - CELL DIFFERENTIATION, 5332
    - TISSUE CULTURE, 5332
  - EPITHELIUM CELLS
    - CELL DIFFERENTIATION, 5332
    - TISSUE CULTURE, 5332

- ADENOLYMPHOMA
  - SALIVARY GLAND NEOPLASMS
    - ULTRASTRUCTURAL STUDY, 5217*

- ADENOMA
  - BRONCHIAL NEOPLASMS
    - CARCINOID TUMOR, 5279
  - ENDOCRINE GLAND NEOPLASMS
    - EPIDEMIOLOGY, HAMSTER, 5276
  - INTESTINAL NEOPLASMS
    - EPIDEMIOLOGY, 5198
    - HYDRAZINE, 1,2-DIMETHYL-, DIHYDROCHLORIDE, 4915
  - LASIOCARPINE
    - CARCINOGENIC ACTICITY, RAT, 4808
  - LUNG NEOPLASMS
    - STERIGMATOCYSTIN, 4802
  - OVARIAN NEOPLASMS
    - RADIATION, IONIZING, 4965
  - PITUITARY NEOPLASMS
    - AGE FACTORS, 5161
    - CASE REPORT, 5168
    - DIAGNOSIS AND PROGNOSIS, 5163
    - HISTOLOGICAL STUDY, 5163
    - PITUITARY HORMONES, 5161, 5162
    - TRIETHYLAMINE, 2-(P-(2-CHLORO-1,2-DIPHENYLVINYL)PHENOXY)-, CITRAT, 5168
    - ULTRASTRUCTURAL STUDY, 5162
    - ULTRASTRUCTURAL STUDY, RAT, 5161
  - RECTAL NEOPLASMS
    - HYDRAZINE, 1,2-DIMETHYL-, DIHYDROCHLORIDE, 4915
  - SALIVARY GLAND NEOPLASMS
    - MUCOPOLYSACCHARIDES, 5219*
  - STOMACH NEOPLASMS
    - GENETICS, 5200
    - PRECANCEROUS CONDITIONS, 4844, 5200
  - UROGENITAL NEOPLASMS
    - EPIDEMIOLOGY, HAMSTER, 5276
  - UTERINE NEOPLASMS
    - REVIEW, 4848

- ADENOMA, CHROMOPHOBE
  - PITUITARY NEOPLASMS
    - ADENOMATOSIS, FAMILIAL ENDOCRINE, 5216*
    - GENETICS, 5216*

- ADENOMATOSIS, FAMILIAL ENDOCRINE
  - PITUITARY NEOPLASMS
    - ADENOMA, CHROMOPHOBE, 5216*

- ADENOSINE CYCLIC 3',5' MONOPHOSPHATE
  - CHOLERA
    - MITOCHONDRIA, 4949*
  - HEPATOMA
    - PROTEIN KINASE, 5355
  - LEUKEMIA, LYMPHOCYTIC
    - DIAGNOSIS AND PROGNOSIS, 5352
  - LEUKEMIA, MYELOBLASTIC

    DIAGNOSIS AND PROGNOSIS, 5352
  LYMPHOMA
    CHOLERA, 4949*
  MELANOMA
    CORTICOTROPIN, 5387*
    EPINEPHRINE, 5388*
    GROWTH, 5385*
    ISOPROTERENOL, 5388*
    MSH, 5387*
    THEOPHYLLINE, 5388*
    XANTHINE, 3-ISOBUTYL-1-METHYL-, 5388*
  NEURILEMMOMA
    CORTICOTROPIN, 5386*
    METABOLISM, 5386*
    PROSTAGLANDINS E, 5386*
  NEUROBLASTOMA
    ACTINOMYCIN D, 5392*
    CARRIER PROTEINS, 5392*
    CELL DIFFERENTIATION, 5392*
    CYCLOHEXIMIDE, 5392*
    PROSTAGLANDINS E, 5392*
    URIDINE, 5-BROMO-2'-DEOXY-, 5392*
  POLYCYTHEMIA VERA
    DIAGNOSIS AND PROGNOSIS, 5352
  SKIN NEOPLASMS
    CELL DIFFERENTIATION, REVIEW, 4871*

ADENOSINE TRIPHOSPHATASE
  EPITHELIAL CELLS
    ANILINE, N,N-DIMETHYL-P-PHENYLAZO-, 4891
  HEPATOMA
    ANILINE, N,N-DIMETHYL-P-PHENYLAZO-, 4891
  L CELLS
    GLYCOPROTEINS, 5399*

ADENYL CYCLASE
  LYMPHOMA
    CHOLERA, 4949*
  VIRUS, B77
    TRANSFORMATION, GENETIC, 5042*
  VIRUS, ROUS SARCOMA
    TRANSFORMATION, GENETIC, 5042*

ADRENAL GLAND NEOPLASMS
  PHEOCHROMOCYTOMA
    THYROID NEOPLASMS, 5160
  THYROID NEOPLASMS
    GENETICS, 5160

AFLATOXIN B1
  ASPERGILLUS FLAVUS
    FOOD CONTAMINATION, 4948*
  BACILLUS SUBTILIS
    MUTAGENIC ACTIVITY, 4883
    SCREENING METHOD, 4883
  CARCINOGENIC ACTIVITY
    REVIEW, 4811
  FOOD CONTAMINATION
    FLUORESCENT PATTERNS, 4948*
  INSECTS
    FOOD CONTAMINATION, 4948*
  SELENIOUS ACID, DISODIUM SALT
    ABNORMALITIES, DRUG INDUCED, 4947*
    LYMPHOCYTE TRANSFORMATION, 4947*
    XENOPUS LAEVIS, 4947*

AGING
  DNA
    CELL CYCLE KINETICS, 5362*
  FIBROBLASTS
    DNA, 5362*

AGRANULOCYTOSIS
  BONE MARROW CELLS
    COLONY FORMATION, 5367*
  CELLULOSE, METHYL ETHER
    COLONY FORMATION, 5367*

AGROBACTERIUM TUMEFACIENS
  EXTRACHROMOSOMAL INHERITANCE
    PLANT TUMORS, 4881
  GUANIDINES
    PLANT TUMORS, 4881
  PLANT TUMORS
    ULTRASTRUCTURAL STUDY, 5266*

AIR POLLUTANTS
  ANTHRACENE
    AUTOMOBILE EXHAUST, 5287
  BENZ(A)ANTHRACENE
    AUTOMOBILE EXHAUST, 5287
  BENZO(A)PYRENE
    AUTOMOBILE EXHAUST, 5287
  BENZO(GHI)PERYLENE
    AUTOMOBILE EXHAUST, 5287
  CHRYSENE
    AUTOMOBILE EXHAUST, 5287
  CORONENE
    AUTOMOBILE EXHAUST, 5287
  DIBENZ(A,H)ANTHRACENE
    AUTOMOBILE EXHAUST, 5287
  DIBENZO(DEF,MNO)CHRYSENE
    AUTOMOBILE EXHAUST, 5287
  FLUORANTHENE
    AUTOMOBILE EXHAUST, 5287
  PHENANTHRENE
    AUTOMOBILE EXHAUST, 5287
  POLYCYCLIC HYDROCARBONS
    AUTOMOBILE EXHAUST, 5287
  PYRENE
    AUTOMOBILE EXHAUST, 5287

AIR POLLUTANTS, RADIOACTIVE
  NEOPLASMS
    RADIATION, IONIZING, 4818
  RADIATION, IONIZING
    RADIATION INJURIES, 4818

ALANINE
  GENES
    CELL CYCLE KINETICS, 5363*
  HEPATOMA
    METABOLISM, RAT LIVER, 5371*
  LIGHT
    MUTAGENIC ACTIVITY, 5363*

ALANINE, 3-(3,4-DIHYDROXYPHENYL)-
  MELANOMA
    FLUORESCENCE, 5156
  MELANOSIS
    FLUORESCENCE, 5156
  NEVUS, PIGMENTED
    FLUORESCENCE, 5156

ALDEHYDE OXIDOREDUCTASES

- HEPATOMA
  - BUTYRIC ACID, 2-AMINO-4-(ETHYLTHIO)-, 4934*
- LIVER NEOPLASMS
  - ACETAMIDE, N-FLUOREN-2-YL-, 4934*
  - ANILINE, N,N-DIMETHYL-P-PHENYLAZO-, 4934*
  - BUTYRIC ACID, 2-AMINO-4-(ETHYLTHIO)-, 4934*

ALKALINE PHOSPHATASE
- COLONIC NEOPLASMS
  - PRECANCEROUS CONDITIONS, 5234*
- HEPATOMA
  - ANILINE, N,N-DIMETHYL-P-PHENYLAZO-, 4891
- STOMACH NEOPLASMS
  - ADENOCARCINOMA, 5359
  - CASE REPORT, 5359

ALPHA PARTICLES
- LUNG NEOPLASMS
  - PARTICLE DISTRIBUTION, REVIEW, 4866*
  - RADIOISOTOPES, 4866*

AMINO ACIDS
- HEPATOMA
  - PROTEINS, 5347

AMINO ACYL T RNA SYNTHETASES
- LEUKEMIA, MYELOBLASTIC
  - DIAGNOSIS AND PROGNOSIS, 5352

AMINOPYRINE N-DEMETHYLASE
- BENZO(A)PYRENE
  - MICROSOMES, LIVER, 4909

AMOSITE
- SEE ASBESTOS

5ALPHA-ANDROSTAN-3-ONE, 17BETA-HYDROXY-
- ESTRADIOL
  - VAGINA, 4886
- PROGESTERONE
  - VAGINA, 4886
- VAGINA
  - DECIDUA, 4886

ANEMIA, APLASTIC
- BONE MARROW CELLS
  - CASE REPORT, 5154
- PRECANCEROUS CONDITIONS
  - CASE REPORT, 5154

ANEMIA, FANCONI'S
- SEE ANEMIA, APLASTIC

ANESTHETICS
- VIRUS, FRIEND MURINE LEUKEMIA
  - CELL DIFFERENTIATION, 5045*

ANEUPLOIDY
- LEUKEMIA
  - ULTRASTRUCTURAL STUDY, NUCLEAR BLEBS, 5257*

ANGIOBLASTOMA
- SEE ANGIOSARCOMA

ANGIOSARCOMA
- HEART NEOPLASMS
  - CASE REPORT, 5245*
- LIVER NEOPLASMS
  - ETHYLENE, CHLORO-, 5193
  - ETHYLENE, CHLORO POLYMER, 5284
- OCCUPATIONAL HAZARD
  - ETHYLENE, CHLORO POLYMER, 5284

ANILINE
- CYTOCHROME P-450
  - MICROSOMES, GUINEA PIG, 4912

ANILINE, N-METHYL-N-NITROSO-
- CHOLANTHRENE, 3-METHYL-
  - DEALKYLATION, RAT, 4899

ANILINE, N,N-DIMETHYL-P-PHENYLAZO-
- DNA
  - BINDING, 4932*
  - CARCINOGENIC METABOLITE, 4932*
- EPITHELIAL CELLS
  - ADENOSINE TRIPHOSPHATASE, 4891
- HEPATOMA
  - ADENOSINE TRIPHOSPHATASE, 4891
  - ALKALINE PHOSPHATASE, 4891
  - EPITHELIAL CELLS, 4891
  - ULTRASTRUCTURAL STUDY, RAT, 4891
- LIVER NEOPLASMS
  - ALDEHYDE OXIDOREDUCTASES, 4934*

ANTHOPHYLLITE
- SEE ASBESTOS

2-ANTHRACENAMIDE
- ANTIGENS, NEOPLASM
  - IMMUNE RESPONSE, REVIEW, 4830

ANTHRACENE
- AIR POLLUTANTS
  - AUTOMOBILE EXHAUST, 5287
- ULTRAVIOLET RAYS
  - CHOLESTEROL, 4901

ANTI-ANTIBODIES
- ASTROCYTOMA
  - ANTIGENIC DETERMINANTS, 5131*
- L CELLS
  - DOSE-RESPONSE STUDY, 5136*
  - GROWTH, 5136*
  - PHOSPHATE, 5132*
  - PHOSPHOLIPIDS, 5132*
- NEURILEMMOMA
  - ANTIGENIC DETERMINANTS, 5131*

ANTIBODIES
- LIVER NEOPLASMS
  - ETHYLENE, CHLORO-, 5191
- LYMPHOSARCOMA
  - LYMPHOCYTES, 5102

ANTIBODIES, NEOPLASM
- HEPATOMA
  - CYTOTOXICITY TESTS, IMMUNOLOGIC, 5133*
  - EPINEPHRINE, 5133*
  - INSULIN, 5133*
  - PREDNISOLONE, 5133*
- L CELLS

- CALCIUM, 5135*
- COMPLEMENT, 5135*
- SARCOMA
  - VIRUS, RETICULOENDOTHELIOSIS, 5119*

NTIBODIES, VIRAL
- CERVIX NEOPLASMS
  - EPIDEMIOLOGY, 4825
  - VIRUS, HERPES SIMPLEX 2, 4825
- LYMPHOMA
  - VIRUS, MAREK'S DISEASE HERPES, 4988
- PULMONARY ADENOMATOSIS, OVINE
  - VIRUS, HERPES, 5062*
- VIRUS, EPSTEIN-BARR
  - CELL TRANSFORMATION, NEOPLASTIC, 5026
  - IMMUNE RESPONSE, REVIEW, 4826
  - LYMPHOCYTE TRANSFORMATION, 5026
- VIRUS, GARDNER ARNSTEIN FELINE SARCOMA
  - AGE FACTORS, 5002
- VIRUS, HERPES SIMPLEX 1
  - ANTIBODY SPECIFICITY, 5095
  - VIRUS, HERPES SIMPLEX 2, 5019
- VIRUS, HERPES SIMPLEX 2
  - ANTIBODY SPECIFICITY, 5095

NTIBODY FORMATION
- VIRUS, BOVINE LEUKEMIA
  - ANTIGENS, VIRAL, 5004

NTIBODY SPECIFICITY
- ASTROCYTOMA
  - IMMUNE SERUMS, 5131*
- CARCINOMA
  - VIRUS, HEP-2, 5009
  - VIRUS, MASON-PFIZER MONKEY, 5009
- LEUKEMIA, MYELOCYTIC
  - IMMUNE SERUMS, 5140*
- MELANOMA
  - ANTIGENS, NEOPLASM, 5134*
  - MEMBRANE IMMUNOFLUORESCENCE ASSAY, 5134*
- NEURILEMMOMA
  - IMMUNE SERUMS, 5131*
- VIRUS, C-TYPE RNA TUMOR
  - IMMUNOELECTRON MICROSCOPY, 5138*
- VIRUS, HERPES SIMPLEX 1
  - ANTIBODIES, VIRAL, 5095
- VIRUS, HERPES SIMPLEX 2
  - ANTIBODIES, VIRAL, 5095

ANTIGEN-ANTIBODY REACTIONS
- LEUKEMIA, LYMPHOBLASTIC
  - LEUKEMIA, MYELOCYTIC, 5140*
- LEUKEMIA, MYELOBLASTIC
  - LEUKEMIA, MYELOCYTIC, 5140*
- VIRUS, EPSTEIN-BARR
  - IMMUNE SERUMS, 5025
- VIRUS, FELINE LEUKEMIA
  - CELL MEMBRANE, 5063*
- VIRUS, HERPES SAIMIRI
  - VIRUS REPLICATION, 5014
- VIRUS, MURINE LEUKEMIA
  - EMBRYO, PREIMPLANTSTION, 5052*

ANTIGENIC DETERMINANTS
- ASTROCYTOMA
  - ANTI-ANTIBODIES, 5131*
- CERVIX NEOPLASMS
  - VIRUS, HERPES SIMPLEX 2, 5088*
- LEUKEMIA
  - HYBRID CELLS, 5094
  - IMMUNE SERUMS, 5094, 5127*
  - T-LYMPHOCYTES, 5094
- LEUKEMIA, HAIRY CELL
  - IGG, 5137*
- LEUKEMIA, LYMPHOBLASTIC
  - VIRUS, GIBBON APE LYMPHOMA, 5138*
- LEUKEMIA, MYELOBLASTIC
  - VIRUS, GIBBON APE LYMPHOMA, 5138*
- LUNG NEOPLASMS
  - PLUTONIUM, 4980*
- NEURILEMMOMA
  - ANTI-ANTIBODIES, 5131*
- SARCOMA
  - VIRUS, HERPES SIMPLEX 2, 5088*
- SARCOMA, OSTEOGENIC
  - PLUTONIUM, 4980*
- VIRUS, C-TYPE RNA TUMOR
  - ANTIGENS, VIRAL, 5138*
- VIRUS, KIRSTEN MURINE SARCOMA
  - VIRUS, HELPER, 5056*
- VIRUS, MOLONEY MURINE SARCOMA
  - CELL TRANSFORMATION, NEOPLASTIC, 5059*
  - VIRUS, MURINE LEUKEMIA, 5059*
- VIRUS, MURINE LEUKEMIA
  - EMBRYO, PREIMPLANTSTION, 5052*
- VIRUS, SIMIAN SARCOMA
  - VIRAL PROTEINS, 5060*

ANTIGENS
- TERATOID TUMOR
  - CELL DIFFERENTIATION, 4829

ANTIGENS, NEOPLASM
- 2-ANTHRACENAMIDE
  - IMMUNE RESPONSE, REVIEW, 4830
- BLADDER NEOPLASMS
  - CARCINOGEN, CHEMICAL, 4830
- BREAST NEOPLASMS
  - VIRUS, MURINE MAMMARY TUMOR, 4828
- CERVIX NEOPLASMS
  - VIRUS, HERPES SIMPLEX 2, 5088*
- CHOLANTHRENE, 3-METHYL-
  - IMMUNE RESPONSE, REVIEW, 4830
- COLONIC NEOPLASMS
  - CELL MEMBRANE, 5235*
- GLYCOPROTEINS
  - CELL MEMBRANE, 5129*
- HISTOCOMPATIBILITY ANTIGENS
  - CELL MEMBRANE, 5129*
- LEUKEMIA
  - HYBRID CELLS, 5094
  - HYPERSENSITIVITY, DELAYED, DOG, 5111
  - IMMUNE SERUMS, 5094
  - LYMPHOCYTE TRANSFORMATION, DOG, 5111
  - T-LYMPHOCYTES, 5094
- LEUKEMIA, LYMPHOBLASTIC
  - HYPERSENSITIVITY, DELAYED, 5128*
  - IMMUNE SERUMS, 5140*
- LEUKEMIA, MYELOBLASTIC
  - IMMUNE SERUMS, 5140*
- MELANOMA

ANTIBODY SPECIFICITY, 5134*
NEOPLASMS
LYMPHOCYTE TRANSFORMATION, DOG, 5111
RECTAL NEOPLASMS
CARCINOGEN, CHEMICAL, 4830
SARCOMA
CHOLANTHRENE, 3-METHYL-, 5118*
CYTOTOXICITY TESTS, IMMUNOLOGIC, 5123*
VIRUS, HERPES SIMPLEX 2, 5088*
SARCOMA, OSTEOGENIC
VIRUS, MOLONEY MURINE SARCOMA, 5114*
VIRUS, ADENO 2
CELL TRANSFORMATION, NEOPLASTIC, 5079*
GLOBULINS, 5C79*
VIRUS, FRIEND MURINE LEUKEMIA
IMMUNOFERRITIN ASSAY, 5130*

ANTIGENS, VIRAL
BREAST NEOPLASMS
VIRUS, MURINE MAMMARY TUMOR, 4828
CARCINOMA
VIRUS, HEP-2, 5009
VIRUS, MASON-PFIZER MONKEY, 5009
CERVIX NEOPLASMS
EPIDEMIOLOGY, 4825
EPIDEMIOLOGY, REVIEW, 4822
VIRUS, HERPES SIMPLEX 2, 4825
FIBROSARCOMA
VIRUS, HERPES SIMPLEX 2, 5089*
LEUKEMIA
ISOLATION AND CHARACTERIZATION, 5127*
LYMPHOMA
VIRUS, MAREK'S DISEASE HERPES, 4988
RETINOBLASTOMA
VIRUS, ADENO 12, 5024
TESTICULAR NEOPLASMS
VIRUS, HERPES SIMPLEX 2, 5022
VIRUS, BOVINE LEUKEMIA
ANTIBODY FORMATION, 5004
VIRUS, C-TYPE RNA TUMOR
ANTIGENIC DETERMINANTS, 5138*
IMMUNOELECTRON MICROSCOPY, 5138*
REVERSE TRANSCRIPTASE, 5011
VIRUS, EPSTEIN-BARR
CELL TRANSFORMATION, NEOPLASTIC, 5026
IMMUNE RESPONSE, REVIEW, 4826
LYMPHOCYTE TRANSFORMATION, 5026
VIRUS, FELINE LEUKEMIA
CELL MEMBRANE, 5063*
VIRUS, FRIEND MURINE LEUKEMIA
C-TYPE PARTICLES, 5130*
IMMUNOFERRITIN ASSAY, 5130*
VIRUS, HERPES SAIMIRI
LYMPHOCYTE TRANSFORMATION, 5015
VIRUS, HERPES SIMPLEX 1
CELL TRANSFORMATION, NEOPLASTIC, 5087*
URIDINE, 2'-DEOXY-5-IODO-, 5087*
VIRUS, HERPES SIMPLEX 2, 5019
VIRUS, HERPES SIMPLEX 2
CELL TRANSFORMATION, NEOPLASTIC, 5089*
VIRUS-LIKE PARTICLES
REVERSE TRANSCRIPTASE, 5011
VIRUS, MAREK'S DISEASE HERPES
IMMUNE RESPONSE, FEATHER FOLLICLES 4988
VIRUS, MURINE MAMMARY TUMOR
TRYPSIN, 5066*
VIRUS, MURINE SARCOMA
ANTIGENIC DETERMINANTS, REVIEW, 4869*
VIRUS, RD-114
REVERSE TRANSCRIPTASE, 5011
VIRUS, SIMIAN SARCOMA
REVERSE TRANSCRIPTASE, 5011
VIRUS, SYNDER-THEILEN FELINE SARCOMA
IMMUNE RESPONSE, 5002

ANTINEOPLASTIC AGENTS
DNA NUCLEOTIDYLTRANSFERASES
EMBRYO, MOUSE, 5034
NUCLEOTIDYLTRANSFERASES
EMBRYO, MOUSE, 5034
RNA POLYMERASE
EMBRYO, MOUSE, 5034
VIRUS, AVIAN MYELOBLASTOSIS
REVERSE TRANSCRIPTASE, 5034
VIRUS, SIMIAN SARCOMA
REVERSE TRANSCRIPTASE, 5034

ANTISERUM
SEE IMMUNE SERUMS

APPENDECTOMY
PANCREATIC NEOPLASMS
RISK FACTORS, 5306*

APPENDICEAL NEOPLASMS
ENDOMETRIOSIS
CELL DIFFERENTIATION, 4846
REVIEW, 4846

ARGININE
HEPATOMA
PROTEINS, 5347

ARSENIC
CARCINOGENIC EFFECT
REVIEW, 4813
LUNG NEOPLASMS
REVIEW, 4813
OCCUPATIONAL HAZARD
REVIEW, 4813

ARSENIC TRIOXIDE
MAMMARY NEOPLASMS, EXPERIMENTAL
ANTICARCINOGENIC EFFECT, REVIEW, 5331*
EPIDEMIOLOGY, REVIEW, 5331*

ARTHRITIS
RADIATION, IONIZING
RADIOTHERAPY DOSAGE, GONADS, 4969

ARTHRITIS, RHEUMATOID
CYCLOPHOSPHAMIDE
CARCINOGENIC POTENTIAL, 4946*
CELL TRANSFORMATION, NEOPLASTIC, 4946*
SIDE EFFECTS, 4946*

- DRUG THERAPY, COMBINATION
  - CELL TRANSFORMATION, NEOPLASTIC, 4946*
  - SIDE EFFECTS, 4946*

ARYL HYDROCARBON HYDROXYLASES
- CYTOCHROME P-450
  - MUTATION, 4859*
- HEPATOMA
  - CHOLANTHRENE, 3-METHYL-, 4987
  - CORTISOL, 4987
  - INSULIN, 4987
- POLONIUM
  - CHOLANTHRENE, 3-METHYL-, 4937*
  - LIVER, MOUSE, 4937*

ARYLSULFATASES
- COLONIC NEOPLASMS
  - PRECANCEROUS CONDITIONS, 5234*

ASBESTOS
- GASTROINTESTINAL NEOPLASMS
  - EPIDEMIOLOGY, 4930*
  - OCCUPATIONAL HAZARD, 4930*, 5286
- LUNG NEOPLASMS
  - PRECANCEROUS CONDITIONS, 4884
- NEOPLASMS, EXPERIMENTAL
  - FIBER STRUCTURE, 4931*
- PERITONEAL NEOPLASMS
  - MESOTHELIOMA, 5285
- PLEURAL NEOPLASMS
  - MESOTHELIOMA, 5285, 5286
  - OCCUPATIONAL HAZARD, 5286
- RESPIRATORY TRACT NEOPLASMS
  - EPIDEMIOLOGY, 4930*
  - MESOTHELIOMA, 4930*
  - OCCUPATIONAL HAZARD, 4930*, 5286

ASBESTOSIS
- COLLAGEN
  - HISTOPATHOLOGICAL STUDY, GUINEA PIG, 4884
- NUCLEIC ACIDS
  - HISTOPATHOLOGICAL STUDY, GUINEA PIG, 4884
- PHOSPHATES
  - HISTOPATHOLOGICAL STUDY, GUINEA PIG, 4884

ASCORBIC ACID
- FIBROBLASTS
  - DNA REPLICATION, 5381*, 5382*
- GYNECOLOGIC NEOPLASMS
  - LEIOMYOMA, 5345
  - PRECANCEROUS CONDITIONS, 5345

ASPERGILLUS FLAVUS
- AFLATOXIN B1
  - FOOD CONTAMINATION, 4948*

ASTROCYTOMA
- ANTIGENIC DETERMINANTS
  - ANTI-ANTIBODIES, 5131*
- CHOLESTEROL
  - ULTRASTRUCTURAL STUDY, 5184
- IMMUNE SERUMS
  - ANTIBODY SPECIFICITY, 5131*

ATAXIA TELANGIECTASIA
- EPIDEMIOLOGY
  - GENETICS, 5317*
- GALLBLADDER NEOPLASMS
  - EPIDEMIOLOGY, 5317*
  - GENETICS, 5317*
- OVARIAN NEOPLASMS
  - EPIDEMIOLOGY, 5317*
  - GENETICS, 5317*
- STOMACH NEOPLASMS
  - EPIDEMIOLOGY, 5317*

AUSTRALIA ANTIGEN
- HEPATOMA
  - EPIDEMIOLOGY, CALIFORNIA, 5305*

8-AZAGUANINE
- ENZYMES
  - MUTAGENIC ACTIVITY, HAMSTER CELLS, 4918

BACILLUS SUBTILIS
- AFLATOXIN B1
  - MUTAGENIC ACTIVITY, 4883
  - SCREENING METHOD, 4883
- DIETHYLAMINE, 2,2'-DICHLORO-N-METHYL-
  - MUTAGENIC ACTIVITY, 4883
  - SCREENING METHOD, 4883
- ETHIDIUM BROMIDE
  - MUTAGENIC ACTIVITY, 4883
  - SCREENING METHOD, 4883
- FLUORENE, 2-NITROSO-
  - MUTAGENIC ACTIVITY, 4883
  - SCREENING METHOD, 4883
- GUANIDINE, 1-METHYL-3-NITRO-1-NITROSO-
  - MUTAGENIC ACTIVITY, 4883
  - SCREENING METHOD, 4883
- QUINOLINE, 4-NITRO-, 1-OXIDE
  - MUTAGENIC ACTIVITY, 4883
  - SCREENING METHOD, 4883

BACTERIAL INFECTIONS
- IMMUNOSUPPRESSION
  - REVIEW, 4835

BARBITURIC ACID, 5-(1-CYCLOHEXEN-1-YL)-1,5-DIMETHYL-, SODIUM SALT
- VEGETABLES
  - METABOLISM, RAT, 4905

BARBITURIC ACID, 5-ETHYL-5-PHENYL-
- CYTOCHROME P-450
  - MICROSOMES, GUINEA PIG, 4912
- DIETHYLAMINE, N-NITROSO-
  - DEALKYLATION, RAT, 4899
- DIMETHYLAMINE, N-NITROSO-
  - DEALKYLATION, RAT, 4899
- DIPROPYLAMINE, N-NITROSO-
  - DEALKYLATION, RAT, 4899

BENZ(A)ANTHRACENE
- AIR POLLUTANTS
  - AUTOMOBILE EXHAUST, 5287
- ARYLOXIRANE DERIVATIVES
  - CARCINOGENIC POTENTIAL, 4935*
  - ISOLATION AND CHARACTERIZATION, 4935*
- BENZ(A)ANTHRACENE-7-CARBOXALDEHYDE, 12-METHYL-
  - K-REGION OXIDES, 4935*

- BENZ(A)ANTHRACENE-12-CARBOXALDEHYDE, 7-METHYL-
    - K-REGION OXIDES, 4935*
- BENZ(A)ANTHRACENE-7,12-DICARBOXALDEHYDE
    - K-REGION OXIDES, 4935*
- DNA
    - BINDING, 4932*
    - CARCINOGENIC METABOLITE, 4932*
- SARCOMA
    - ARYLOXIRANE DERIVATIVES, 4935*
- TOBACCO
    - QUANTITATION METHOD, 4903

BENZ(A)ANTHRACENE-7-CARBOXALDEHYDE, 12-METHYL-
- BENZ(A)ANTHRACENE
    - K-REGION OXIDES, 4935*

BENZ(A)ANTHRACENE-12-CARBOXALDEHYDE, 7-METHYL-
- BENZ(A)ANTHRACENE
    - K-REGION OXIDES, 4935*

BENZ(A)ANTHRACENE-7,12-DICARBOXALDEHYDE
- BENZ(A)ANTHRACENE
    - K-REGION OXIDES, 4935*

BENZ(A)ANTHRACENE, 7,12-DIMETHYL-
- DEUTERIUM
    - CARBONIUM ION, CHARGE LOCALIZATION, 4939*
- DNA
    - BINDING, 4932*
    - CARCINOGENIC METABOLITE, 4932*
- MAMMARY NEOPLASMS, EXPERIMENTAL
    - DNA REPLICATION, 4910
    - ESTRUS, 4910
    - PEROXIDASES, 5360
    - PROLACTIN, 4910
- PHORBOL 12,13-DIDECANOATE
    - CELL TRANSFORMATION, NEOPLASTIC, 4904
- 12-O-TETRADECANOYLPHORBOL-13-ACETATE
    - CELL TRANSFORMATION, NEOPLASTIC, 4904

BENZ(A)ANTHRACENE, 7-METHYL-
- CHOLANTHRENE, 3-METHYL-
    - MICROSOMES, LIVER, 4911
- DNA
    - K-REGION EPOXIDES, 4911
    - MICROSOMES, LIVER, 4911

BENZENE
- CYTOCHROME P-450
    - MICROSOMES, GUINEA PIG, 4912

BENZENE, 4-ALLYL-1,2-(METHYLENEDIOXY)-
- HEPATOMA
    - CARCINOGENIC ACTIVITY, RAT, MOUSE, 4807
    - ISOLATION AND CHARACTERIZATION, 4807

BENZENE, ETHYL-
- CYTOCHROME P-450
    - MICROSOMES, GUINEA PIG, 4912

BENZENE, 1,2-(METHYLENEDIOXY)-4-PROPENYL-
- HEPATOMA
    - CARCINOGENIC ACTIVITY, RAT, MOUSE, 4807
    - ISOLATION AND CHARACTERIZATION, 4807

BENZENE, 1,2-METHYLENEDIOXY-4-PROPYL-
- ESOPHAGEAL NEOPLASMS
    - ISOLATION AND CHARACTERIZATION, 4807
- HEPATOMA
    - CARCINOGENIC ACTIVITY, RAT, MOUSE, 4807
    - ISOLATION AND CHARACTERIZATION, 4807

BENZO(A)PYRENE
- AIR POLLUTANTS
    - AUTOMOBILE EXHAUST, 5287
- ARYLOXIRANE DERIVATIVES
    - CARCINOGENIC POTENTIAL, 4935*
    - ISOLATION AND CHARACTERIZATION, 4935*
- BENZO(A)PYRENE-6-CARBOXALDEHYDE
    - K-REGION OXIDES, 4935*
- BENZO(A)PYRENE, 6-OXIRANYL-
    - K-REGION OXIDES, 4935*
- CHOLANTHRENE, 3-METHYL-
    - CELL TRANSFORMATION, NEOPLASTIC, 4904
- DNA
    - BINDING, 4938*
    - CARCINOGENIC METABOLITE, 4908
    - COVALENT COMPLEX, FLUORESCENCE SPECTRA, 4938*
    - DIOL EPOXIDES, 4938*
    - EPITHELIAL CELLS, 4908
- ENVIRONMENTAL HAZARD
    - DOSE-RESPONSE STUDY, 4929*
- EPITHELIAL CELLS
    - CARCINOGENIC METABOLITE, 4908
- HEPATOMA
    - CELL TRANSFORMATION, NEOPLASTIC, 4909
- LUNG NEOPLASMS
    - CARCINOMA, EPIDERMOID, 4929*
    - DOSE-RESPONSE STUDY, 4929*
    - SARCOMA, RETICULUM CELL, 4929*
- MICROSOMES, LIVER
    - AMINOPYRINE N-DEMETHYLASE, 4909
    - CARCINOGENIC METABOLITE, 4906
    - CYTOCHROME P-450, 4909
    - CYTOCHROMES, 4909
    - HYDROXYLASES, 4909
    - K-REGION EPOXIDES, 4907
    - QUANTITATION METHOD, 4906
- NEOPLASMS, EXPERIMENTAL
    - DOSE-RESPONSE STUDY, 4929*
- SARCOMA
    - ARYLOXIRANE DERIVATIVES, 4935*
- 12-O-TETRADECANOYLPHORBOL-13-ACETATE
    - CELL TRANSFORMATION, NEOPLASTIC, 4904
- TOBACCO
    - QUANTITATION METHOD, 4903
- ULTRAVIOLET RAYS

        CHOLESTEROL, 4901
    VEGETABLES
        METABOLISM, RAT, 4905

BENZO(A)PYRENE-6-CARBOXALDEHYDE
    BENZO(A)PYRENE
        K-REGION OXIDES, 4935*

BENZO(A)PYRENE, 6-OXIRANYL-
    BENZO(A)PYRENE
        K-REGION OXIDES, 4935*

BENZO(GHI)PERYLENE
    AIR POLLUTANTS
        AUTOMOBILE EXHAUST, 5287

BENZOIC ACID, GUANIDINONITROPHENYL-
    VIRUS, MURINE SARCOMA
        PEPTIDE HYDROLASES, 5007

BENZOPYRENE HYDROXYLASE
    SEE ALSO HYDROXYLASES/ARYL HYDROCARBON HYDROXYLASE

BILE DUCT NEOPLASMS
    CARCINOMA
        CLONORCHIASIS, 5194
    CHOLANGIOMA
        DOG, 5324*
    DOG
        EPIDEMIOLOGY, 5324*

BLADDER NEOPLASMS
    CAFFEINE
        EPIDEMIOLOGY, 5282
    CARCINOGEN, CHEMICAL
        ANTIGENS, NEOPLASM, 4830
        IMMUNE RESPONSE, REVIEW, 4830
    CARCINOMA, EPIDERMOID
        SCHISTOSOMIASIS, 5236*
    EPIDEMIOLOGY
        UNITED STATES, 5320*
    FORMAMIDE, N-(4-(5-NITRO-2-FURANYL)-2-THIAZOLYL)-
        ULTRASTRUCTURAL STUDY, RAT, 4892
    NEOPLASMS, MULTIPLE PRIMARY
        REVIEW, 4849
    OCCUPATIONAL HAZARD
        EPIDEMIOLOGY, 5282
        REVIEW, 4849
    PAPILLOMA
        SCHISTOSOMIASIS, 5236*
    PRECANCEROUS CONDITIONS
        REVIEW, 4849
    SCHISTOSOMIASIS
        HISTOPATHOLOGICAL STUDY, 5236*
        OVIPOSITION, 5236*
    SMOKING
        EPIDEMIOLOGY, 5282
    SOCIOECONOMIC FACTORS
        DIAGNOSIS AND PROGNOSIS, 5307*
        NEOPLASM METASTASIS, 5307*
        NEOPLASM RECURRENCE, LOCAL, 5307*
    TARS
        EPIDEMIOLOGY, WEST GERMANY, 5283
        OCCUPATIONAL HAZARD, 5283
    UREA, METHYL NITROSO-
        CELL MEMBRANE, 4956*
        CELL TRANSFORMATION, NEOPLASTIC, 4956*
        EPITHELIAL CELLS, 4956*

BLOOD PLATELET DISORDERS
    NEUTROPHILS
        STATISTICAL ANALYSIS, 5340

BLOOD PLATELETS
    CELL DIVISION
        GLIAL CELLS, 5337
    GROWTH SUBSTANCES
        ISOLATION AND CHARACTERIZATION, 5337
    LEUKEMIA, MYELOCYTIC
        ULTRASTRUCTURAL STUDY, 5253*

BONE MARROW CELLS
    AGRANULOCYTOSIS
        COLONY FORMATION, 5367*
    ANEMIA, APLASTIC
        CASE REPORT, 5154
    CARBAMIC ACID, ETHYL ESTER
        B-LYMPHOCYTES, 5105
        T-LYMPHOCYTES, 5105
    LEUKEMIA
        CELL DIFFERENTIATION, 5155
        HISTOLOGICAL STUDY, 5155
        ULTRASTRUCTURAL STUDY, NUCLEAR BLEBS, 5257*
        UREA, METHYL NITROSO-, 4894
    RADIATION, IONIZING
        CELL DIFFERENTIATION, 4964
        CHROMOSOME ABERRATIONS, 4958
        HEMATOPOIESIS, 4964
        B-LYMPHOCYTES, 4964
        ULTRASTRUCTURAL STUDY, 4964
    SARCOMA, YOSHIDA
        IMMUNITY, ACTIVE, 5120*
    UREA, METHYL NITROSO-
        HEMATOPOIETIC STEM CELLS, 4894

BONE NEOPLASMS
    CARCINOMA
        CALCITONIN, 5339

BRADYKININ
    FIBROSARCOMA
        NEOPLASM TRANSPLANTATION, 5067*
        VIRUS, SV40, 5067*

BRAIN NEOPLASMS
    DISGERMINOMA
        CASE REPORT, 5182
        HISTOLOGICAL STUDY, 5182
        NEOPLASMS, MULTIPLE PRIMARY, 5182
    MENINGIOMA
        RADIATION, IONIZING, 5221*
    MYOBLASTOMA
        CYCASIN, 5183
        EPIDEMIOLOGY, RAT, 5183
        HISTOLOGICAL STUDY, RAT, 5183
        METHANOL, (METHYL-ONN-AZOXY)-, ACETATE (ESTER), 5183
        MYCOTOXINS, 5183
        SODIUM IODIDE, 5183
    PINEALOMA
        CASE REPORT, 5182
        HISTOLOGICAL STUDY, 5182

- BREAST NEOPLASMS
  - ADENOFIBROMA
    - CHONDROITIN, 5344
    - HYALURONIC ACID, 5344
  - AGROMEGALY
    - CASE REPORT, 5165
  - CARCINOMA
    - AGROMEGALY, 5165
  - CARCINOMA, SCIRRHOUS
    - CHONDROITIN, 5344
    - HYALURONIC ACID, 5344
  - COLONIC NEOPLASMS
    - EPIDEMIOLOGY, REVIEW, 5269
  - CYSTOSARCOMA PHYLLODES
    - CASE REPORT, 5164
    - HISTOLOGICAL STUDY, 5164
  - DIET
    - EPIDEMIOLOGY, REVIEW, 4851
  - EPIDEMIOLOGY
    - UTAH, 5293*
  - ESTROGENS
    - SEX CHROMATIN, 5166
  - ETHNIC GROUPS
    - EPIDEMIOLOGY, SINGAPORE, 5292*
  - GENETICS
    - EPIDEMIOLOGY, 5312*
    - EPIDEMIOLOGY, REVIEW, 4851
    - RISK ANALYSIS, 5312*
  - HISTOLOGICAL STUDY
    - REVIEW, 4852
  - HORMONES
    - EPIDEMIOLOGY, REVIEW, 4851
    - REVIEW, 4852
  - HYPERTENSION
    - EPIDEMIOLOGY, 5274
  - IMMUNE SERUMS
    - T-LYMPHOCYTES, 5139*
    - ROSETTE FORMATION, 5139*
  - ISOANTIGENS
    - EPIDEMIOLOGY, REVIEW, 4851
  - MAMMOGRAPHY
    - AGE FACTORS, 4985*
  - MENOPAUSE
    - ESTROGENS, 5166
  - MENSTRUATION
    - ESTROGENS, 5166
  - NEOPLASMS, MULTIPLE PRIMARY
    - EPIDEMIOLOGY, REVIEW, 4851
  - PAPAIN
    - ROSETTE FORMATION, 5139*
  - PITUITARY NEOPLASMS
    - CASE REPORT, 5216*
  - PRECANCEROUS CONDITIONS
    - EPIDEMIOLOGY, BEAGLE BITCHES, 5275
    - REVIEW, 4852
  - RADIATION, IONIZING
    - ACNUE, 4976*
    - CARCINOGENIC POTENTIAL, 4976*
    - CASE REPORT, 4976*
    - HIRSUTISM, 4976*
    - PNEUMOTHERAPY, EPIDEMIOLOGY, 4986*
  - RESERPINE
    - EPIDEMIOLOGY, 5274
    - HYPERTENSION, 5274
  - VIRUS, B-TYPE RNA TUMOR
    - NUCLEIC ACID HYBRIDIZATION, 4820
    - REVIEW, 4820
    - VIRUS, MURINE MAMMARY TUMOR, 4820
  - VIRUS-LIKE PARTICLES
    - EPIDEMIOLOGY, REVIEW, 4851
  - VIRUS, MURINE MAMMARY TUMOR
    - ANTIGENS, NEOPLASM, 4828
    - ANTIGENS, VIRAL, 4828

- BRONCHI
  - POLYCYCLIC HYDROCARBONS
    - BINDING, 5225*

- BRONCHIAL NEOPLASMS
  - ADENOCARCINOMA
    - CILIA, 5226*
  - ADENOMA
    - CARCINOID TUMOR, 5279
  - CARCINOID TUMOR
    - CILIA, 5226*
    - EPIDEMIOLOGY, SCOTLAND, 5227*
    - EPIDEMIOLOGY, SWITZERLAND, 5279
    - NEOPLASM METASTASIS, 5227*
  - CARCINOMA
    - CILIA, 5226*
    - EPIDEMIOLOGY, SCOTLAND, 5227*
    - EPIDEMIOLOGY, SWITZERLAND, 5279
    - NEOPLASM METASTASIS, 5227*
  - CARCINOMA, EPIDERMOID
    - CILIA, 5226*
  - CELL DIFFERENTIATION
    - ULTRASTRUCTURAL STUDY, 5225*
  - CILIA
    - ULTRASTRUCTURAL STUDY, 5226*
  - CYLINDROMA
    - EPIDEMIOLOGY, SCOTLAND, 5227*
    - NEOPLASM METASTASIS, 5227*
  - ESTROGENS
    - GLYCOPROTEINS, 5167
  - PRECANCEROUS CONDITIONS
    - CYTOCHEMICAL STUDY, 5225*
    - ULTRASTRUCTURAL STUDY, 5225*
  - SMOKING
    - CILIA, 5226*

- BURKITT'S LYMPHOMA
  - CHROMOSOME ABERRATIONS
    - REVIEW, 4873*
  - GEOGRAPHY
    - EPIDEMIOLOGY, REVIEW, 4837
  - LEUKEMIA
    - CASE REPORT, 5148
  - TISSUE CULTURE
    - AGE FACTORS, 5354
    - ENZYMATIC ACTIVITY, 5354
  - VIRUS, EPSTEIN-BARR
    - CARCINOGENIC POTENTIAL, REVIEW, 4824

- BURSA OF FABRICIUS
  - SARCOMA
    - IMMUNITY, CELLULAR, 5119*

- BUTYRIC ACID, 2-AMINO-4-(ETHYLTHIO)-
  - ACETIC ACID, COPPER(2+) SALT
    - RNA, TRANSFER, 4924
  - HEPATOMA
    - ALDEHYDE OXIDOREDUCTASES, 4934*
  - LIVER NEOPLASMS
    - ALDEHYDE OXIDOREDUCTASES, 4934*
  - RNA, TRANSFER
    - LEUCINE, 4924
    - LIVER, RAT, 4924

CADMIUM
- LUNG VOLUME MEASUREMENTS
  - DOSE-RESPONSE STUDY, 4942*
- OCCUPATIONAL HAZARD
  - LUNG VOLUME MEASUREMENTS, 4942*
- PULMONARY FIBROSIS
  - OCCUPATIONAL HAZARD, 4942*

CAFFEINE
- BLADDER NEOPLASMS
  - EPIDEMIOLOGY, 5282

CALCITONIN
- BONE NEOPLASMS
  - CARCINOMA, 5339

CALCIUM
- L CELLS
  - ANTIBODIES, NEOPLASM, 5135*
  - COMPLEMENT, 5135*
  - GLYCOPROTEINS, 5399*

CALCIUM SULFATE DIHYDRATE
- NEOPLASMS, EXPERIMENTAL
  - FIBER STRUCTURE, 4931*

CANAVANINE
- HEPATOMA
  - PROTEINS, 5347

CANCER
- SEE NEOPLASMS (GENERAL AND UNSPECIFIED)

CARBAMIC ACID, ETHYL ESTER
- GONADS
  - EMBRYO, MOUSE, 4941*
- HEPATOMA
  - AGE FACTORS, MOUSE, 4941*
  - TRANSPLACENTAL CARCINOGENESIS, MOUSE, 4941*
- LUNG NEOPLASMS
  - AGE FACTORS, MOUSE, 4941*
  - TRANSPLACENTAL CARCINOGENESIS, MOUSE, 4941*
- B-LYMPHOCYTES
  - BONE MARROW CELLS, 5105
  - IMMUNE RESPONSE, THYMUS, RAT, 5105
- T-LYMPHOCYTES
  - BONE MARROW CELLS, 5105
  - IMMUNE RESPONSE, THYMUS, RAT, 5105
- OVARIAN NEOPLASMS
  - AGE FACTORS, MOUSE, 4941*
  - TRANSPLACENTAL CARCINOGENESIS, MOUSE, 4941*
- TESTIS
  - EMBRYO, MOUSE, 4941*

CARBOHYDRATES
- ADENINE NUCLEOTIDES
  - CELL TRANSFORMATION, NEOPLASTIC, 5343
  - FIBROBLASTS, 5343
- HEXOKINASE
  - CELL TRANSFORMATION, NEOPLASTIC, 5343
  - FIBROBLASTS, 5343
- LEUKEMIA L1210
  - BINDING SITES, 5097
  - CELL MEMBRANE, 5097
  - CONCANAVALIN A, 5097
- NAD
  - CELL TRANSFORMATION, NEOPLASTIC, 5343
  - FIBROBLASTS, 5343

CARBOXY-LYASES
- FIBROSARCOMA
  - NEOPLASM TRANSPLANTATION, 5067*
  - VIRUS, SV40, 5067*
- HEPATOMA
  - CYCLOHEXIMIDE, 5357
  - DEXAMETHASONE, 5357
  - DIBUTYRYL CYCLIC AMP, 5357
  - POLYAMINES, 5357
- VIRUS, POLYOMA
  - ACTINOMYCIN D, 5074*
  - CYCLOHEXIMIDE, 5074*
  - DNA REPLICATION, 5074*
  - RNA REPLICATION, 5074*

CARCINOEMBRYONIC ANTIGEN
- COLONIC NEOPLASMS
  - DIAGNOSIS AND PROGNOSIS, 4834
  - IMMUNITY, CELLULAR, 4834
  - PRECANCEROUS CONDITIONS, 5234*
  - REVIEW, 4834

CARCINOGEN, CHEMICAL
- BLADDER NEOPLASMS
  - ANTIGENS, NEOPLASM, 4830
  - IMMUNE RESPONSE, REVIEW, 4830
- CELL TRANSFORMATION, NEOPLASTIC
  - REVIEW, 4803
- CYTOCHROME P-450
  - MUTATION, 4859*
- GASTROINTESTINAL NEOPLASMS
  - EPIDEMIOLOGY, REVIEW, 4878*
- LEUKEMIA
  - EPIDEMIOLOGY, REVIEW, 4877*
- NEOPLASMS, EXPERIMENTAL
  - ANTIGENIC DETERMINANTS, REVIEW, 4830
- RECTAL NEOPLASMS
  - ANTIGENS, NEOPLASM, 4830
  - IMMUNE RESPONSE, REVIEW, 4830
- WATER POLLUTANTS
  - AMES TEST, 4928*

CARCINOID TUMOR
- BRONCHIAL NEOPLASMS
  - ADENOMA, 5279
  - CILIA, 5226*
  - EPIDEMIOLOGY, SCOTLAND, 5227*
  - EPIDEMIOLOGY, SWITZERLAND, 5279
  - NEOPLASM METASTASIS, 5227*

CARCINOMA
- BILE DUCT NEOPLASMS
  - CLONORCHIASIS, 5194
- BONE NEOPLASMS
  - CALCITONIN, 5339
- BREAST NEOPLASMS
  - ACROMEGALY, 5165
- BRONCHIAL NEOPLASMS
  - CILIA, 5226*
  - EPIDEMIOLOGY, SCOTLAND, 5227*
  - EPIDEMIOLOGY, SWITZERLAND, 5279

    - NEOPLASM METASTASIS, 5227*
  - CERVIX NEOPLASMS
    - CYTOLOGICAL SCREENING, 5270
    - EPIDEMIOLOGY, 5177
    - HISTOLOGICAL STUDY, 5177
  - COLONIC NEOPLASMS
    - AGE FACTORS, 5197
    - DIAGNOSIS AND PROGNOSIS, 5197
    - PRECANCEROUS CONDITIONS, 5197
  - ENDOCRINE GLAND NEOPLASMS
    - EPIDEMIOLOGY, HAMSTER, 5276
  - GYNECOLOGIC NEOPLASMS
    - ULTRASTRUCTURAL STUDY, REVIEW, 4850
  - KIDNEY NEOPLASMS
    - EPIDEMIOLOGY, GERMANY, 5207
  - LUNG NEOPLASMS
    - HISTOLOGICAL STUDY, PERIFOCAL INFLAMMATION, 5187
  - NEOPLASM METASTASIS
    - MICROCIRCULATION, 5116*
  - OVARIAN NEOPLASMS
    - CELL CYCLE KINETICS, 5170
    - DNA, NEOPLASM, 5170
    - KARYOTYPING, 5170
  - PANCREATIC NEOPLASMS
    - EPIDEMIOLOGY, 5306*
  - PAROTID NEOPLASMS
    - RADIATION, IONIZING, 5220*
  - SEBACEOUS GLAND NEOPLASMS
    - EPIDEMIOLOGY, DOG, 5325*
  - STOMACH NEOPLASMS
    - CASE REPORT, MENETRIER'S DISEASE, 5204
    - EPIDEMIOLOGY, EAST GERMANY, 5267
    - GUANIDINE, 1-METHYL-3-NITRO-1-NITROSO-, 4920
    - NEOPLASM METASTASIS, 5205
  - THYROID NEOPLASMS
    - CHROMOSOMES, HUMAN, 6-12, 5232*
    - EPIDEMIOLOGY, 5311*
  - UROGENITAL NEOPLASMS
    - CELL CYCLE KINETICS, 5170
    - DNA, NEOPLASM, 5170
    - KARYOTYPING, 5170
  - VIRUS, HEP-2
    - ANTIBODY SPECIFICITY, 5009
    - ANTIGENS, VIRAL, 5009
  - VIRUS, MASON-PFIZER MONKEY
    - ANTIBODY SPECIFICITY, 5009
    - ANTIGENS, VIRAL, 5009

- CARCINOMA, BASAL CELL
  - SKIN NEOPLASMS
    - ELASTIC TISSUE, 5157
    - RADIATION, IONIZING, 4968
    - ULTRASTRUCTURAL STUDY, 5157

- CARCINOMA, BRONCHIOLAR
  - MITRAL VALVE STENOSIS
    - CASE REPORT, 5188
  - PULMONARY FIBROSIS
    - CASE REPORT, 5188

- CARCINOMA, EHRLICH TUMOR
  - CHALONES
    - DNA NUCLEOTIDYLTRANSFERASES, 5397*
    - DNA REPLICATION, 5397*
    - RNA REPLICATION, 5397*
  - DNA NUCLEOTIDYLTRANSFERASES
    - CELL CYCLE KINETICS, 5353
  - NEOPLASM TRANSPLANTATION
    - CELL CYCLE KINETICS, 5366*
    - CHROMOSOME ABERRATIONS, 5366*
  - RNA, MESSENGER
    - PHOSPHATES, 5335
  - RNA, NEOPLASM
    - ISOLATION AND CHARACTERIZATION, 5335
    - PHOSPHATES, 5335
    - POLY U, 5335
  - RNA, RIBOSOMAL
    - PHOSPHATES, 5335
  - VINCALEUKOBLASTINE
    - CELL CYCLE KINETICS, 5366*
    - CHROMOSOME ABERRATIONS, 5366*

- CARCINOMA, EMBRYONAL
  - SEE TERATOID TUMOR

- CARCINOMA, EPIDERMOID
  - BLADDER NEOPLASMS
    - SCHISTOSOMIASIS, 5236*
  - BRONCHIAL NEOPLASMS
    - CILIA, 5226*
  - CERVIX NEOPLASMS
    - CHROMOSOME ABERRATIONS, 5173, 51
  - CHALONES
    - REVIEW, 4856
  - LASIOCARPINE
    - CARCINOGENIC ACTICITY, RAT, 4808
  - LUNG NEOPLASMS
    - BENZO(A)PYRENE, 4929*
    - HISTOLOGICAL STUDY, PERIFOCAL INFLAMMATION, 5187
  - SKIN NEOPLASMS
    - RADIATION, IONIZING, 4968

- CARCINOMA IN SITU
  - CERVIX NEOPLASMS
    - CHROMOSOME ABERRATIONS, 5173
    - CYTOLOGICAL SCREENING, 5270
    - EPIDEMIOLOGY, 5177
    - EPIDEMIOLOGY, DENMARK, 5270
    - HISTOLOGICAL STUDY, 5177

- CARCINOMA, MUCINOUS
  - INTESTINAL NEOPLASMS
    - EPIDEMIOLOGY, CAT, 5323*
  - OVARIAN NEOPLASMS
    - ULTRASTRUCTURAL STUDY, 5214*

- CARCINOMA, PAPILLARY
  - THYROID NEOPLASMS
    - DIAGNOSIS AND TREATMENT, 5309*
    - EPIDEMIOLOGY, 5311*
    - EPIDEMIOLOGY, SCANDINAVIA, 5309*

- CARCINOMA, RENAL CELL
  - SEE ADENOCARCINOMA

- CARCINOMA, SCIRRHOUS
  - BREAST NEOPLASMS
    - CHONDROITIN, 5344
    - HYALURONIC ACID, 5344

- CARCINOMA, SQUAMOUS CELL
  - SEE CARCINOMA, EPIDERMOID

CARCINCMA, TRANSITIONAL CELL
    URETERAL NEOPLASMS
        CASE REPORT, 5231*

CARCINOMA 256, WALKER
    GUANIDINE, 1-ETHYL-3-NITRO-1-NITROSO-
        IMMUNE RESPONSE, RAT, 4916
        IMMUNITY, CELLULAR, 4916
    STOMACH NEOPLASMS
        GUANIDINE, 1-ETHYL-3-NITRO-1-NITROSO-, 4916

CARCINOSARCOMA
    UROGENITAL NEOPLASMS
        CELL CYCLE KINETICS, 5170
        KARYOTYPING, 5170

CAROTID BODY TUMOR
    CELLULAR INCLUSIONS
        ULTRASTRUCTURAL STUDY, 5250*
    HEAD AND NECK NEOPLASMS
        CASE REPORT, 5250*

CARRIER PROTEINS
    NEUROBLASTOMA
        ADENOSINE CYCLIC 3',5' MONOPHOSPHATE, 5392*
        RADIATION, IONIZING, 5392*

CELIAC DISEASE
    CORONARY DISEASE
        EPIDEMIOLOGY, 5316*
    GASTROINTESTINAL NEOPLASMS
        EPIDEMIOLOGY, 5316*
    LYMPHOMA
        EPIDEMIOLOGY, 5316*

CELL ADHESION
    FIBROBLASTS
        CELLS, CULTURED, 4879*
        ULTRASTRUCTURAL STUDY, 4879*
    VIRUS, MURINE SARCOMA
        CELL TRANSFORMATION, NEOPLASTIC, 5055*
        ULTRASTRUCTURAL STUDY, 5055*
    VIRUS, POLYOMA
        CELL TRANSFORMATION, NEOPLASTIC, 5077*

CELL DIFFERENTIATION
    ADENOIDS
        CELLS, CULTURED, 5332
        EPITHELIUM CELLS, 5332
    APPENDICEAL NEOPLASMS
        ENDOMETRIOSIS, 4846
    BRONCHIAL NEOPLASMS
        ULTRASTRUCTURAL STUDY, 5225*
    DIBUTYRYL CYCLIC AMP
        OVARY, HAMSTER, 5391*
    ERYTHROLEUKEMIA
        ACETIC ACID, 4998
        HEMATOPOIETIC STEM CELLS, 5291
        METHANE, SULFINYLBIS-, 4998
        PLACENTAL EXTRACTS, 4998
        VIRUS, FRIEND MURINE LEUKEMIA, 5045*
    HEPATCMA
        GLYCOLYSIS, 5334
        RESPIRATION, 5334
        TRANSPLANTATION, HOMOLOGOUS, 4898
        ULTRASTRUCTURAL STUDY, 5190
    KIDNEY NEOPLASMS
        TRANSPLANTATION, HOMOLOGOUS, 4898
    LEUKEMIA
        BONE MARROW CELLS, 5155
        HEMATOPOIETIC STEM CELLS, 4845
        RADIATION, IONIZING, 4975*
        REVIEW, 4845
        STRONTIUM RADIOISOTOPES, 4975*
    LEUKEMIA, HAIRY CELL
        B-LYMPHOCYTES, 5255*
    LEUKEMIA, MYELOCYTIC
        HEMATOPOIETIC STEM CELLS, 5254*, 5291
    LEUKEMIA, PLASMACYTIC
        HEMATOPOIETIC STEM CELLS, 5291
    LIVER NEOPLASMS
        TRANSPLANTATION, HCMOLOGOUS, 4898
    LYMPHOSARCOMA
        TRANSPLANTATION, HOMOLOGOUS, 4898
    MAMMARY NEOPLASMS, EXPERIMENTAL
        DIBUTYRYL CYCLIC AMP, 5390*
        ESTRADIOL, 5390*
    NEUROBLASTOMA
        ADENOSINE CYCLIC 3',5' MONOPHOSPHATE, 5392*
        CHROMATIN, 5368*
        DIBUTYRYL CYCLIC AMP, 5368*
        NUCLEOPROTEINS, 5368*
    PEPTIDE HYDROLASES
        REVIEW, 4857
    RADIATION, IONIZING
        BONE MARROW CELLS, 4964
    RETINOBLASTOMA
        FLEXNER-WINTERSTEINER ROSETTES, 5241*
        HISTOLOGICAL STUDY, 5241*
    SALIVARY GLAND NEOPLASMS
        CELLS, CULTURED, 5219*
    4,4'-STILBENEDIOL, ALPHA,ALPHA'-DIETHYL-
        MULLERIAN DUCTS, 4944*
    TERATOID TUMOR
        ANTIGENS, 4829
        CELL MEMBRANE, 4829
    12-O-TETRADECANOYLPHORBOL-13-ACETATE
        EPIDERMIS, MOUSE, 4936*
        HISTOLOGICAL STUDY, 4936*
        KERATIN PRECURSORS, 4936*
    THYMOMA
        RADIATION, 4979*
    URETHRAL NEOPLASMS
        ENDOMETRIOSIS, 4846
    UTERINE NEOPLASMS
        ELASTIC TISSUE, 5171
        TRANSPLANTATION, HOMOLOGOUS, 4898
    VIRUS, FRIEND MURINE LEUKEMIA
        ANESTHETICS, 5045*
        CELL MEMBRANE, 5045*
        METHANE, SULFINYLBIS-, 5045*

CELL DIVISION
    BLOOD PLATELETS
        GLIAL CELLS, 5337
    CHALONES
        EPIDERMIS, 5333
    LEUKEMIA L1210
        METHANESULFONIC ACID, THIO-, S-

    - METHYL ESTER, 5336
    - SULFHYDRYL COMPOUNDS, 5336
  - PLASMACYTOMA
    - METHANESULFONIC ACID, THIO-, S-METHYL ESTER, 5336
    - SULFHYDRYL COMPOUNDS, 5336
  - SARCOMA, RETICULUM CELL
    - METHANESULFONIC ACID, THIO-, S-METHYL ESTER, 5336
    - SULFHYDRYL COMPOUNDS, 5336
  - VIRUS, SV40
    - NAD, 5070*

CELL FUSION
  - CHORIOCARCINOMA
    - ENZYMATIC ACTIVITY, MOUSE, 5364*
    - GENETICS, 5364*
    - NUCLEOSIDE DEAMINASES, 5364*
  - MACROPHAGES
    - HYBRID CELLS, 5071*

CELL MEMBRANE
  - ADENOCARCINOMA
    - HISTOCOMPATIBILITY ANTIGENS, 5264*
    - ULTRASTRUCTURAL STUDY, 5264*
  - ANTIGENS, NEOPLASM
    - GLYCOPROTEINS, 5129*
    - HISTCCOMPATIBILITY ANTIGENS, 5129*
  - BLADDER NEOPLASMS
    - UREA, METHYL NITROSO-, 4956*
  - COLONIC NEOPLASMS
    - ANTIGENS, NEOPLASM, 5235*
    - ULTRASTRUCTURAL STUDY, 5235*
  - CONCANAVALIN A
    - BINDING, 5338
  - DIBUTYRYL CYCLIC AMP
    - AGGLUTINATION, 5338
    - OVARY, HAMSTER, 5391*
    - SURFACE PROPERTIES, 5338
  - GLYCOPEPTIDES
    - CELL TRANSFORMATION, NEOPLASTIC, 5395*
  - HEPATOMA
    - ULTRASTRUCTURAL STUDY, 5190
  - LEUKEMIA L1210
    - ACTINOMYCIN D, 5370*
    - CARBOHYDRATES, 5097
    - ULTRASTRUCTURAL STUDY, 5097
  - LEUKEMIA, MYELOCYTIC
    - PYROANTIMONATE BINDING, 5256*
  - LYMPHOCYTES
    - CELL MOVEMENT, REVIEW, 4831
  - LYMPHOSARCOMA
    - CONCANAVALIN A, 5261*
    - GLYCOPROTEINS, 5261*
    - HEXOSES, 5261*
    - PLANT AGGLUTININS, 5261*
  - PLANT AGGLUTININS
    - AGGLUTINATION, 5338
    - BINDING, 5338
  - SARCOMA, RETICULUM CELL
    - CONCANAVALIN A, 5261*
    - GLYCOPROTEINS, 5261*
    - HEXOSES, 5261*
    - PLANT AGGLUTININS, 5261*
  - TERATCID TUMOR
    - CELL DIFFERENTIATION, 4829
  - TRYPSIN
    - AGGLUTINATION, 5338
  - UREA, METHYL NITROSO-
    - EPITHELIAL CELLS, 4956*
  - VIRUS, ADENO 2
    - PEPTIDES, 5084*
  - VIRUS, FELINE LEUKEMIA
    - ANTIGEN-ANTIBODY REACTIONS, 5063*
    - ANTIGENS, VIRAL, 5063*
  - VIRUS, FRIEND MURINE LEUKEMIA
    - CELL DIFFERENTIATION, 5045*
  - VIRUS, MURINE LEUKEMIA
    - VIRUS REPLICATION, 5053*
  - VIRUS, POLYOMA
    - CELL TRANSFORMATION, NEOPLASTIC, 5077*
  - VIRUS, SV40
    - LIPIDS, 5068*

CELL NUCLEUS
  - ACETAMIDE
    - DNA, 4889
    - RNA, 4889
  - ACETAMIDE, THIO-
    - DNA, 4889
    - RNA, 4889
  - PLANT TUMORS
    - CHROMOSOME ABERRATIONS, 4950*
    - DNA, NEOPLASM, 4950*
    - KARYOTYPING, 4950*

CELL SURVIVAL
  - RADIATION
    - DOSE-RESPONSE STUDY, REVIEW, 4863*
  - VIRUS, CYTOMEGALO
    - TRANSPLANTATION, 5117*
  - VIRUS, HERPES SIMPLEX 1
    - TRANSPLANTATION, 5117*
  - VIRUS, HERPES SIMPLEX 2
    - TRANSPLANTATION, 5117*
    - ULTRAVIOLET RAYS, 5117*

CELL TRANSFORMATION, NEOPLASTIC
  - ACETAMIDE
    - DNA, 4889
    - RNA, 4889
  - ACETAMIDE, THIO-
    - DNA, 4889
    - RNA, 4889
  - ACTINOMYCIN D
    - GLYCOPEPTIDES, 5395*
  - BENZ(A)ANTHRACENE, 7,12-DIMETHYL-
    - PHORBOL 12,13-DIDECANOATE, 4904
    - 12-O-TETRADECANOYLPHORBOL-13-ACETATE, 4904
  - BENZO(A)PYRENE
    - CHOLANTHRENE, 3-METHYL-, 4904
    - 12-O-TETRADECANOYLPHORBOL-13-ACETATE, 4904
  - BLADDER NEOPLASMS
    - UREA, METHYL NITROSO-, 4956*
  - CARBOHYDRATES
    - ADENINE NUCLEOTIDES, 5343
    - HEXOKINASE, 5343
    - NAD, 5343
  - CARCINOGEN, CHEMICAL
    - REVIEW, 4803
  - CELL MEMBRANE
    - GLYCOPEPTIDES, 5395*
  - CHOLANTHRENE, 3-METHYL-
    - PHORBOL 12,13-DIDECANOATE, 4904

  12-O-TETRADECANOYLPHORBOL-13-ACETATE, 4904
CYCLOPHOSPHAMIDE
  ARTHRITIS, RHEUMATOID, 4946*
DRUG THERAPY, COMBINATION
  ARTHRITIS, RHEUMATOID, 4946*
FIBROBLASTS
  CELLS, CULTURED, 5376*
FLUOROSCOPY
  EPIDEMIOLOGY, 4981*
  PNEUMOPERITONEUM, 4981*
  PNEUMOTHORAX, 4981*
HEPATOMA
  BENZO(A)PYRENE, 4909
  GLYCOLYSIS, 5371*
LESCH-NYHAN SYNDROME
  VIRUS, SV40, 5071*
LIVER NEOPLASMS
  DIETHYLAMINE, N-NITROSO-, 4896
LYMPHOMA
  VIRUS, PAPOVA, 4995
MORPHOLINE, 4-NITROSO-
  RNA, RIBOSOMAL, 4917
PEPTIDE HYDROLASES
  REVIEW, 4857
PLASMINOGEN ACTIVATORS
  EMBRYO, 5394*
PROSTATIC NEOPLASMS
  VIRUS, HERPES SIMPLEX 2, 5022
RADIATION, IONIZING
  DOSE-RESPONSE STUDY, LINEAR ENERGY TRANSFER, 4861*
SARCOMA
  VIRUS, PAPOVA, 4995
UREA, METHYL NITROSO-
  EPITHELIAL CELLS, 4956*
VIRUS, ADENO 2
  ANTIGENS, NEOPLASM, 5079*
  DNA REPLICATION, 5023
  IMMUNOGLOBULINS, SURFACE, 5079*
VIRUS, ADENO 7
  DNA REPLICATION, 5023
VIRUS, ADENO 12
  DNA REPLICATION, 5023
VIRUS, B77
  TRANSFORMATION, GENETIC, 5042*
VIRUS, EPSTEIN-BARR
  ANTIBODIES, VIRAL, 5026
  ANTIGENS, VIRAL, 5026
  DNA, VIRAL, 5091*
  IMMUNE RESPONSE, REVIEW, 4826
  B-LYMPHOCYTES, 5091*
VIRUS, FRIEND MURINE LEUKEMIA
  GOLGI APPARATUS, 5050*
VIRUS, HERPES SAIMIRI
  IMMUNE RESPONSE, 5015
  LYMPHOCYTES, 5014
VIRUS, HERPES SIMPLEX 1
  ANTIGENS, VIRAL, 5087*
VIRUS, HERPES SIMPLEX 2
  ACRIDINE, 3,6-DIAMINO-, 5089*
  ANTIGENS, VIRAL, 5089*
  LIGHT, 5089*
VIRUS, MOLONEY MURINE SARCOMA
  ANTIGENIC DETERMINANTS, 5059*
  PEPTIDES, 5059*
VIRUS, MURINE LEUKEMIA
  HEMATOPOIETIC STEM CELLS, 5046*
  LEUCINE, 5054*
VIRUS, MURINE SARCOMA
  CELL ADHESION, 5055*
  LEUCINE, 5054*
  PEPTIDE HYDROLASES, 5007
VIRUS, POLYOMA
  CELL ADHESION, 5077*
  CELL MEMBRANE, 5077*
  DNA, VIRAL, 5076*
  TEMPERATURE SENSITIVE MUTANTS, 5076*
VIRUS, RNA TUMOR
  AGGLUTINATION, 5035*
VIRUS, ROUS SARCOMA
  DNA REPLICATION, 5036*
  GLUCOSE, 5378*
  GOLGI APPARATUS, 5050*
  GROWTH SUBSTANCES, 4990
  PLASMINOGEN ACTIVATORS, 5038*
  PROTEINS, 5040*
  RNA REPLICATION, 4994
  TRANSFORMATION, GENETIC, 5042*
VIRUS, SV40
  DNA REPLICATION, 5393*
  GLYCOLYSIS, 5343
  HISTOCOMPATIBILITY ANTIGENS, 5072*
  KIDNEY, DOG, 5068*
  MACROPHAGES, 5098
  NAD, 5070*
  NADP, 5070*
  PLASMINOGEN ACTIVATOR, 5069*
  PLASMINOGEN ACTIVATORS, 5038*
  PROTEINS, 5393*

CELLS, CULTURED
ADENOIDS
  CELL DIFFERENTIATION, 5332
  TISSUE CULTURE, 5332
CELL MEMBRANE
  ISOLATION AND CHARACTERIZATION, RAT, 5373*
  ULTRASTRUCTURAL STUDY, 5373*
COLONIC NEOPLASMS
  VIRUS REPLICATION, 5235*
DNA REPLICATION
  CELL DENSITITY, 5348
  ENZYMATIC ACTIVITY, 5373*
FIBROBLASTS
  CELL ADHESION, 4879*
  CELL TRANSFORMATION, NEOPLASTIC, 5376*
  GROWTH, 5380*
  SURFACE PROPERTIES, 5380*
FIBROSARCOMA
  NEOPLASM METASTASIS, 5376*
MAMMARY NEOPLASMS, EXPERIMENTAL
  CONTACT INHIBITION, 5377*
SALIVARY GLAND NEOPLASMS
  CELL DIFFERENTIATION, 5219*
  MUCOPOLYSACCHARIDES, 5219*
SMOKING
  DNA, 4952*
VIRUS, BOVINE LEUKEMIA
  VIRUS REPLICATION, 5003

CELLULAR INCLUSIONS
CAROTID BODY TUMOR
  ULTRASTRUCTURAL STUDY, 5250*
HEPATOMA
  ALCOHOLIC HYALINE, 5212*

        ULTRASTRUCTURAL STUDY, 5212*
    PARAGANGLIOMA, NONCHROMAFFIN
        ULTRASTRUCTURAL STUDY, 5248*

CELLULOSE, METHYL ETHER
    AGRANULOCYTOSIS
        COLONY FORMATION, 5367*
    FIBROBLASTS
        GROWTH, 5380*
        SURFACE PROPERTIES, 5380*

CERIUM RADIOISOTOPES
    LUNG NEOPLASMS
        DOSE-RESPONSE STUDY, 4978*
        HISTOLOGICAL STUDY, BEAGLE, 4978*
    LYMPH NODES
        DOSE-RESPONSE STUDY, 4978*
        HISTOLOGICAL STUDY, BEAGLE, 4978*
    LYMPHATIC NEOPLASMS
        HISTOLOGICAL STUDY, BEAGLE, 4978*
    RESPIRATORY TRACT
        DOSE-RESPONSE STUDY, 4978*
        HISTOLOGICAL STUDY, BEAGLE, 4978*

CERVIX NEOPLASMS
    ANTIBODIES, VIRAL
        EPIDEMIOLOGY, 4825
    ANTIGENS, VIRAL
        EPIDEMIOLOGY, 4825
        EPIDEMIOLOGY, REVIEW, 4822
    CARCINOMA
        CYTOLOGICAL SCREENING, 5270
        EPIDEMIOLOGY, 5177
        EPIDEMIOLOGY, DENMARK, 5270
        HISTOLOGICAL STUDY, 5177
    CARCINOMA, EPIDERMOID
        CHROMOSOME ABERRATIONS, 5173, 5174
    CARCINOMA IN SITU
        CHROMOSOME ABERRATIONS, 5173
        CYTOLOGICAL SCREENING, 5270
        EPIDEMIOLOGY, 5177
        EPIDEMIOLOGY, DENMARK, 5270
        HISTOLOGICAL STUDY, 5177
    GONORRHEA
        EPIDEMIOLOGY, 5177
    MYCOPLASMA INFECTIONS
        VAGINAL SMEARS, 5176
    NEOPLASM METASTASIS
        CYTOLOGICAL SCREENING, 5270
        EPIDEMIOLOGY, 5177
        EPIDEMIOLOGY, DENMARK, 5270
        HISTOLOGICAL STUDY, 5177
    PARITY
        EPIDEMIOLOGY, EAST GERMANY, 5271
    PRECANCEROUS CONDITIONS
        CHROMOSOME ABERRATIONS, 5173, 5174
        CYTOLOGICAL SCREENING, 5270
        EPIDEMIOLOGY, 5177
        EPIDEMIOLOGY, AZERBAIJAN SSR, 5273
        EPIDEMIOLOGY, DENMARK, 5270
        EPIDEMIOLOGY, EAST GERMANY, 5271
        EPIDEMIOLOGY, YOUNG WOMAN, 5172
        HISTOLOGICAL STUDY, 5177
    SARCOMA
        VIRUS, HERPES SIMPLEX 2, 5088*
    VAGINAL SMEARS
        EPIDEMIOLOGY, YOUNG WOMAN, 5172
    VIRUS, HERPES SIMPLEX 2
        ANTIBODIES, VIRAL, 4825
        ANTIGENIC DETERMINANTS, 5088*
        ANTIGENS, NEOPLASM, 5088*
        ANTIGENS, VIRAL, 4825
        CARCINOGENIC POTENTIAL, REVIEW, 4824
        EPIDEMIOLOGY, 4825
        EPIDEMIOLOGY, REVIEW, 4822
        VENEREAL DISEASES, 4825

CHALONES
    CARCINOMA, EHRLICH TUMOR
        DNA NUCLEOTIDYLTRANSFERASES, 5397*
        DNA REPLICATION, 5397*
        RNA REPLICATION, 5397*
    CARCINOMA, EPIDERMOID
        REVIEW, 4856
    DNA REPLICATION
        CELL CYCLE KINETICS, 5396*
        CONNECTIVE TISSUE, HAMSTER, 5396*
        EPITHELIUM, HAMSTER, 5396*
    EPIDERMIS
        CELL DIVISION, 5333
        DNA REPLICATION, 5333
        ISOLATION AND CHARACTERIZATION, 5333
    LYMPHOMA
        REVIEW, 4856
    MELANOMA
        REVIEW, 4856
    NEOPLASMS
        CELL CYCLE KINETICS, 4856
        REVIEW, 4856

CHOLANGIOMA
    BILE DUCT NEOPLASMS
        DOG, 5324*
    LIVER CIRRHOSIS
        CLONORCHIASIS, 5194
    LIVER NEOPLASMS
        CLONORCHIASIS, 5194

CHOLANTHRENE, 3-METHYL-
    ANILINE, N-METHYL-N-NITROSO-
        DEALKYLATION, RAT, 4899
    ANTIGENS, NEOPLASM
        IMMUNE RESPONSE, REVIEW, 4830
    BENZ(A)ANTHRACENE, 7-METHYL-
        MICROSOMES, LIVER, 4911
    BENZO(A)PYRENE
        CELL TRANSFORMATION, NEOPLASTIC, 4904
    CYTOCHROME P-450
        MICROSOMES, GUINEA PIG, 4912
    DENERVATION
        CARCINOGENIC ACTIVITY, FROG, 4900
    DEUTERIUM
        CARBONIUM ION, CHARGE LOCALIZATION 4939*
    DIETHYLAMINE, N-NITROSO-
        DEALKYLATION, RAT, 4899
    DIMETHYLAMINE, N-NITROSO-
        DEALKYLATION, RAT, 4899
    DIPROPYLAMINE, N-NITROSO-
        DEALKYLATION, RAT, 4899
    FIBROSARCOMA
        NEOPLASM METASTASIS, 5265*
    HEPATOMA
        ARYL HYDROCARBON HYDROXYLASES, 4987

  - GLUCOSE PHOSPHATASE, 4987
  - GLUCOSEPHOSPHATE DEHYDROGENASE, 4987
- HYDRAZINE, 1,1-DIMETHYL-
  - DEALKYLATION, RAT, 4899
- OXIDOREDUCTASES, N-DEMETHYLATING
  - MICROSOMES, LIVER, RAT, 4899
- PHORBOL 12,13-DIDECANOATE
  - CELL TRANSFORMATION, NEOPLASTIC, 4904
- POLONIUM
  - ARYL HYDROCARBON HYDROXYLASES, 4937*
- SARCOMA
  - ANTIGENS, NEOPLASM, 5118*
  - CARCINOGENIC ACTIVITY, FROG, 4900
  - CYCLOHEXANECARBOXYLIC ACID, 4-(AMINOMETHYL)-, 5211
  - IMMUNITY, CELLULAR, 5122*
  - LYMPHOCYTE TRANSFORMATION, 5118*
- 12-O-TETRADECANOYLPHORBOL-13-ACETATE
  - CELL TRANSFORMATION, NEOPLASTIC, 4904
- ULTRAVIOLET RAYS
  - CHOLESTEROL, 4901

HOLERA
- ADENOSINE CYCLIC 3',5' MONOPHOSPHATE
  - MITOCHONDRIA, 4949*
- IMMUNOGLOBULINS, FC
  - MITOCHONDRIA, 4949*
- IMMUNOGLOBULINS, SURFACE
  - MITOCHONDRIA, 4949*
- LYMPHOMA
  - ADENOSINE CYCLIC 3',5' MONOPHOSPHATE, 4949*
  - ADENYL CYCLASE, 4949*

HOLESTEROL
- ANTHRACENE
  - ULTRAVIOLET RAYS, 4901
- ASTROCYTOMA
  - ULTRASTRUCTURAL STUDY, 5184
- BENZO(A)PYRENE
  - ULTRAVIOLET RAYS, 4901
- CHOLANTHRENE, 3-METHYL-
  - ULTRAVIOLET RAYS, 4901
- GLIOBLASTOMA MULTIFORME
  - ULTRASTRUCTURAL STUDY, 5184
- HEPATOMA
  - COENZYME A, 5358
  - MICROSOMES, LIVER, 5358
- OLIGODENDROGLIOMA
  - ULTRASTRUCTURAL STUDY, 5184
- POLYCYCLIC HYDROCARBONS
  - FREE RADICALS, 4901

HONDROITIN
- BREAST NEOPLASMS
  - ADENOFIBROMA, 5344
  - CARCINOMA, SCIRRHOUS, 5344

HORIOCARCINOMA
- CELL FUSION
  - ENZYMATIC ACTIVITY, MOUSE, 5364*
  - GENETICS, 5364*
  - NUCLEOSIDE DEAMINASES, 5364*
- HYBRID CELLS
  - ENZYMATIC ACTIVITY, MOUSE, 5364*
  - GENETICS, 5364*
  - NUCLEOSIDE DEAMINASES, 5364*

CHROMATIN
- HEPATOMA
  - HISTONES, 5346
  - PROTEINS, 5346
- NEUROBLASTOMA
  - CELL DIFFERENTIATION, 5368*
  - NUCLEOPROTEINS, 5368*

CHROMOSOME ABERRATIONS
- BURKITT'S LYMPHOMA
  - REVIEW, 4873*
- CARCINOMA, EHRLICH TUMOR
  - NEOPLASM TRANSPLANTATION, 5366*
  - VINCALEUKOBLASTINE, 5366*
- CERVIX NEOPLASMS
  - CARCINOMA, EPIDERMOID, 5173, 5174
  - CARCINOMA IN SITU, 5173
  - PRECANCEROUS CONDITIONS, 5173, 5174
- HELA CELLS
  - REVIEW, 4873*
- HEPATOMA
  - DIETHYLAMINE, N-NITROSO-, 4897
- KARYOTYPING
  - MULTIPLE TRANSPLANTS, 5369*
  - NEOPLASM TRANSPLANTATION, 5369*
- LEUKEMIA, LYMPHOBLASTIC
  - HORIZONTAL TRANSMISSION, 5146
  - VERTICAL TRANSMISSION, 5146
- LEUKEMIA, MYELOCYTIC
  - REVIEW, 4873*
- LYMPHOSARCOMA
  - REVIEW, 4873*
- MENINGIOMA
  - REVIEW, 4873*
- NEOPLASMS
  - CELL CYCLE KINETICS, 5181
  - CYTODIAGNOSIS, 5181
  - GENETICS, 5180
- NEPHROBLASTOMA
  - REVIEW, 4873*
- PLANT TUMORS
  - CELL NUCLEUS, 4950*
- RADIATION
  - ANIMALS, LABORATORY, 4862*
  - GERM CELLS, 4862*
- RADIATION, IONIZING
  - BONE MARROW CELLS, 4958
  - DOSE-RESPONSE STUDY, 4977*
  - LYMPHOCYTES, 4977*
- RETINOBLASTOMA
  - REVIEW, 4873*

CHROMOSOME ABNORMALITIES
- LEUKEMIA
  - TRANSPLACENTAL CARCINOGENESIS, 4876*

CHROMOSOMES
- HELA CELLS
  - SATELLITE ASSOCIATION, 5179
- VIRUS, MURINE LEUKEMIA
  - VIRUS REPLICATION, 5049*

CHROMOSOMES, HUMAN, 6-12
- LESCH-NYHAN SYNDROME

    - VIRUS, SV40, 5071*
  - THYROID NEOPLASMS
    - CARCINOMA, 5232*
    - HISTOCOMPATIBILITY ANTIGENS, 5232*
    - NEOPLASTIC ENDOCRINE-LIKE SYNDROMES, 5232*
  - VIRUS, SV40
    - HYBRID CELLS, 5071*

- CHROMOSOMES, HUMAN, 21-22
  - LEUKEMIA, LYMPHOBLASTIC
    - REVIEW, 4874*

- CHRYSENE
  - AIR POLLUTANTS
    - AUTOMOBILE EXHAUST, 5287
  - TOBACCO
    - QUANTITATION METHOD, 4903

- CHRYSOTILE
  - SEE ASBESTOS

- CILIA
  - BRONCHIAL NEOPLASMS
    - ADENOCARCINOMA, 5226*
    - CARCINOID TUMOR, 5226*
    - CARCINOMA, 5226*
    - CARCINOMA, EPIDERMOID, 5226*
    - SMOKING, 5226*
    - ULTRASTRUCTURAL STUDY, 5226*

- CITRIC ACID
  - HEPATOMA
    - METABOLISM, RAT LIVER, 5371

- CLONORCHIASIS
  - BILE DUCT NEOPLASMS
    - CARCINOMA, 5194
  - CHOLANGIOMA
    - LIVER CIRRHOSIS, 5194
  - HEPATOMA
    - LIVER CIRRHOSIS, 5194
  - LIVER NEOPLASMS
    - CHOLANGIOMA, 5194
  - LYMPHOMA
    - LIVER CIRRHOSIS, 5194

- COENZYME A
  - HEPATOMA
    - CHOLESTEROL, 5358

- COLCHICINE
  - LEUKEMIA, MYELOCYTIC
    - CASE REPORT, 4923
    - GOUT, 4923
  - MULTIPLE MYELOMA
    - CASE REPORT, 4923
    - GOUT, 4923

- COLITIS
  - SIGMOID NEOPLASMS
    - EPIDEMIOLOGY, 5230*

- COLITIS, ULCERATIVE
  - COLONIC NEOPLASMS
    - PRECANCEROUS CONDITIONS, REVIEW, 5195

- COLLAGEN
  - ASBESTOSIS
    - HISTOPATHOLOGICAL STUDY, GUINEA PIG, 4884

- COLONIC NEOPLASMS
  - ADENOCARCINOMA
    - GENETICS, 5199
    - HYDRAZINE, 1,2-DIMETHYL-, 4914
    - INTESTINAL POLYPS, 5199
    - MICROVILLI, 5228*
    - PRECANCEROUS CONDITIONS, 5199
  - ALKALINE PHOSPHATASE
    - PRECANCEROUS CONDITIONS, 5234*
  - ARYLSULFATASES
    - PRECANCEROUS CONDITIONS, 5234*
  - BREAST NEOPLASMS
    - EPIDEMIOLOGY, REVIEW, 5269
  - CARCINOEMBRYONIC ANTIGEN
    - DIAGNOSIS AND PROGNOSIS, 4834
    - IMMUNITY, CELLULAR, 4834
    - PRECANCEROUS CONDITIONS, 5234*
    - REVIEW, 4834
  - CARCINOMA
    - AGE FACTORS, 5197
    - DIAGNOSIS AND PROGNOSIS, 5197
    - PRECANCEROUS CONDITIONS, 5197
  - CELL MEMBRANE
    - ANTIGENS, NEOPLASM, 5235*
    - ULTRASTRUCTURAL STUDY, 5235*
  - CELLS, CULTURED
    - VIRUS REPLICATION, 5235*
  - COLITIS, ULCERATIVE
    - PRECANCEROUS CONDITIONS, REVIEW, 5195
  - DIET
    - EPIDEMIOLOGY, REVIEW, 5268
    - REVIEW, 5269
  - EPIDEMIOLOGY, SOCIOECONOMIC FACTORS
    - REVIEW, 5269
  - GENETICS
    - EPIDEMIOLOGY, REVIEW, 5268
  - HYDRAZINE, 1,2-DIMETHYL-
    - CARCINOGENIC ACTIVITY, RAT, 4914
    - DIET, 4914
  - LACTATE DEHYDROGENASE
    - PRECANCEROUS CONDITIONS, 5234*
  - LYMPHOCYTES
    - IMMUNITY, CELLULAR, 5125*
  - T-LYMPHOCYTES
    - IMMUNITY, CELLULAR, 5125*
  - NEOPLASM METASTASIS
    - MICROVILLI, 5228*
  - NEOPLASM RECURRENCE, LOCAL
    - STATISTICAL ANALYSIS, 5308*
  - NEOPLASMS, MULTIPLE PRIMARY
    - EPIDEMIOLOGY, REVIEW, 5195
  - POLYPS
    - PRECANCEROUS CONDITIONS, REVIEW, 5195
  - PRECANCEROUS CONDITIONS
    - EPIDEMIOLOGY, REVIEW, 5269
  - RECTAL NEOPLASMS
    - EPIDEMIOLOGY, REVIEW, 5269
  - SEX FACTORS
    - EPIDEMIOLOGY, 4841
    - EPIDEMIOLOGY, REVIEW, 5268

- COMMUNICABLE DISEASES
  - LEUKEMIA

- EPIDEMIOLOGY, REVIEW, 4877*

COMPLEMENT
- IMMUNE SERUMS
  - BINDING, SERA, MALIGNANT, 5142*
- IMMUNOLOGIC DEFICIENCY SYNDROMES
  - ESTERASES, 5150
- L CELLS
  - ANTIBODIES, NEOPLASM, 5135*
  - CALCIUM, 5135*
  - GROWTH, 5136*
  - NEOPLASM TRANSPLANTATION, 5143*
- LYMPHOSARCOMA
  - LYMPHOCYTES, 5102

CONCANAVALIN A
- CELL MEMBRANE
  - BINDING, 5338
- HEPATOMA
  - FETAL GLOBULINS, 5103
- LYMPHOCYTES
  - CELL MOVEMENT, REVIEW, 4831
  - IMMUNE RESPONSE, REVIEW, 4831
- LYMPHOSARCOMA
  - CELL MEMBRANE, 5261*
- SARCOMA, RETICULUM CELL
  - CELL MEMBRANE, 5261*
- VIRUS, C-TYPE RNA TUMOR
  - VIRUS INDUCTION, 4997
- VIRUS, SV40
  - PLASMINOGEN ACTIVATOR, 5069*

CONTACT INHIBITION
- MAMMARY NEOPLASMS, EXPERIMENTAL
  - ADENOCARCINOMA, 5377*
  - CELLS, CULTURED, 5377*
- MULTIPLE MYELOMA
  - HYBRID CELLS, 5112

CONTRACEPTIVE DEVICES, FEMALE
- VAGINAL NEOPLASMS
  - PRECANCEROUS CONDITIONS, 5175

CONTRACEPTIVES, ORAL
- HEPATOMA
  - CASE REPORT, 5239*

CORONARY DISEASE
- CELIAC DISEASE
  - EPIDEMIOLOGY, 5316*

CORONENE
- AIR POLLUTANTS
  - AUTOMOBILE EXHAUST, 5287

CORTICOTROPIN
- MELANOMA
  - ADENOSINE CYCLIC 3',5' MONOPHOSPHATE, 5387*
  - SURFACE PROPERTIES, 5387*
- NEURILEMMOMA
  - ADENOSINE CYCLIC 3',5' MONOPHOSPHATE, 5386*
  - SURFACE PROPERTIES, 5386*

CORTISOL
- HEPATOMA
  - ARYL HYDROCARBON HYDROXYLASES, 4987
  - CYTOTOXICITY TESTS, IMMUNOLOGIC, 5133*
  - GLUCOSEPHOSPHATASE, 4987
  - GLUCOSEPHOSPHATE DEHYDROGENASE, 4987
- OVARIAN NEOPLASMS
  - IMMUNE RESPONSE, 5110
  - NEOPLASM TRANSPLANTATION, 5110

COUMARIN, 7-ETHOXY-
- VEGETABLES
  - METABOLISM, RAT, 4905

P-CRESOL, 2,6-DI-TERT-BUTYL-
- LEUKEMIA, MYELOCYTIC
  - RADIATION, IONIZING, 4954*
- STOMACH NEOPLASMS
  - DIETHYLAMINE, N-NITROSO-, 4954*
- THYMOMA
  - RADIATION, IONIZING, 4954*

CROCIDOLITE
- SEE ASBESTOS

CYCASIN
- BRAIN NEOPLASMS
  - MYOBLASTOMA, 5183

CYCLIC AMP
- SEE ADENOSINE CYCLIC 3',5' MONOPHOSPHATE

CYCLOHEXANECARBOXYLIC ACID, 4-(AMINOMETHYL)-
- SARCOMA
  - CHOLANTHRENE, 3-METHYL-, 5211
  - FIBRINOLYSIS, 5211
  - NEOPLASM METASTASIS, 5211
  - NEOPLASM TRANSPLANTATION, 5211

CYCLOHEXIMIDE
- HEPATOMA
  - CARBOXY-LYASES, 5357
  - PROTEINS, 5347
- LEUKEMIA, MYELOCYTIC
  - INTERFERON, 5109
- NEUROBLASTOMA
  - ADENOSINE CYCLIC 3',5' MONOPHOSPHATE, 5392*
- VIRUS, MOLONEY MURINE LEUKEMIA
  - VIRUS REPLICATION, 5048*
- VIRUS, POLYOMA
  - CARBOXY-LYASES, 5074*
- VIRUS, ROUS SARCOMA
  - PEPTIDE HYDROLASES, 4991

CYCLOPHOSPHAMIDE
- ARTHRITIS, RHEUMATOID
  - CARCINOGENIC POTENTIAL, 4946*
  - CELL TRANSFORMATION, NEOPLASTIC, 4946*
  - SIDE EFFECTS, 4946*
- MUTAGENIC ACTIVITY, YEAST
  - SCREENING METHOD, 4880

CYLINDROMA
- BRONCHIAL NEOPLASMS
  - EPIDEMIOLOGY, SCOTLAND, 5227*
  - NEOPLASM METASTASIS, 5227*

- CYSTADENOMA, MUCINOUS
  - GYNECOLOGIC NEOPLASMS
    - ULTRASTRUCTURAL STUDY, REVIEW, 4850
  - OVARIAN NEOPLASMS
    - ULTRASTRUCTURAL STUDY, 5214*

- CYSTADENOMA, PAPILLARY
  - OVARIAN NEOPLASMS
    - CASE REPORT, TWINS, 5169

- CYSTOSARCOMA PHYLLODES
  - BREAST NEOPLASMS
    - CASE REPORT, 5164
    - HISTOLOGICAL STUDY, 5164

- CYTOCHALASIN B
  - VIRUS, KIRSTEN MURINE SARCOMA-LEUKEMIA
    - VIRUS REPLICATION, 5001

- CYTOCHROME P-450
  - ANILINE
    - MICROSOMES, GUINEA PIG, 4912
  - BARBITURIC ACID, 5-ETHYL-5-PHENYL-
    - MICROSOMES, GUINEA PIG, 4912
  - BENZENE
    - MICROSOMES, GUINEA PIG, 4912
  - BENZENE, ETHYL-
    - MICROSOMES, GUINEA PIG, 4912
  - BENZO(A)PYRENE
    - MICROSOMES, LIVER, 4909
  - CARCINOGEN, CHEMICAL
    - MUTATION, 4859*
  - CHOLANTHRENE, 3-METHYL-
    - MICROSOMES, GUINEA PIG, 4912
  - ETHANE, 1,1,1-TRICHLORO-2,2-BIS(P-CHLOROPHENYL)-
    - RETINOL, 4890
    - METABOLISM, PIG, 4885
  - MUTATION
    - ARYL HYDROCARBON HYDROXYLASES, 4859*
    - HYDROXYLASES, 4859*
  - NAPHTHALENE
    - MICROSOMES, GUINEA PIG, 4912

- CYTOCHROMES
  - BENZO(A)PYRENE
    - MICROSOMES, LIVER, 4909

- CYTOPLASM
  - DNA REPLICATION
    - REVIEW, 4858
  - RADIATION, IONIZING
    - DOSE RESPONSE STUDY, 4966
    - ULTRASTRUCTURAL STUDY, 4966

- CYTOSINE
  - NUCLEIC ACIDS
    - CARCINOGENIC ACTIVITY, 4815
    - MUTAGENIC ACTIVITY, 4815
    - REVIEW, 4815

- CYTOTOXICITY TESTS, IMMUNOLOGIC
  - HEPATOMA
    - ANTIBODIES, NEOPLASM, 5133*
    - CORTISOL, 5133*
    - DIETHYLAMINE, N-NITROSO-, 5133*
    - EPINEPHRINE, 5133*
    - INSULIN, 5133*
    - PREDNISOLONE, 5133*
  - SARCOMA
    - ANTIGENS, NEOPLASM, 5123*
    - IMMUNITY, CELLULAR, 5123*
  - SARCOMA, OSTEOGENIC
    - VIRUS, MOLONEY MURINE SARCOMA, 5114*

- DECIDUA
  - 5ALPHA-ANDROSTAN-3-ONE, 17BETA-HYDROXY-
    - VAGINA, 4886

- DENDRITES
  - MELANOMA
    - FLUORESCENCE, 5156

- DENERVATION
  - CHOLANTHRENE, 3-METHYL-
    - CARCINOGENIC ACTIVITY, FROG, 4900

- DEOXY SUGARS
  - MELANOMA
    - URIDINE, 5-BROMO-2'-DEOXY-, 5375*

- DEUTERIUM
  - BENZ(A)ANTHRACENE, 7,12-DIMETHYL-
    - CARBONIUM ION, CHARGE LOCALIZATION, 4939*
  - CHOLANTHRENE, 3-METHYL-
    - CARBONIUM ION, CHARGE LOCALIZATION, 4939*

- DEXAMETHASONE
  - HEPATOMA
    - CARBOXY-LYASES, 5357
    - TYROSINE AMINOTRANSFERASE, 5358
  - VIRUS, KIRSTEN MURINE SARCOMA
    - VIRUS, HELPER, 5056*

- DIABETES MELLITUS
  - PANCREATIC NEOPLASMS
    - RISK FACTORS, 5306*

- DIBENZ(A,H)ANTHRACENE
  - AIR POLLUTANTS
    - AUTOMOBILE EXHAUST, 5287

- DIBENZO(DEF,MNO)CHRYSENE
  - AIR POLLUTANTS
    - AUTOMOBILE EXHAUST, 5287

- DIBUTYRYL CYCLIC AMP
  - CELL DIFFERENTIATION
    - OVARY, HAMSTER, 5391*
  - CELL MEMBRANE
    - AGGLUTINATION, 5338
    - OVARY, HAMSTER, 5391*
    - SURFACE PROPERTIES, 5338
  - HEPATOMA
    - CARBOXY-LYASES, 5357
  - MAMMARY NEOPLASMS, EXPERIMENTAL
    - CELL DIFFERENTIATION, 5390*
  - MELANOMA

        GROWTH, 5385*
    NEUROBLASTOMA
        CELL DIFFERENTIATION, 5368*

IET
    BREAST NEOPLASMS
        EPIDEMIOLOGY, REVIEW, 4851
    COLONIC NEOPLASMS
        EPIDEMIOLOGY, REVIEW, 5268
        REVIEW, 5269
    GASTROINTESTINAL NEOPLASMS
        EPIDEMIOLOGY, REVIEW, 4878*
    SELENIUM
        ANTICARCINOGENIC EFFECT, REVIEW, 5331*

IETARY FATS
    INTESTINAL NEOPLASMS
        EPIDEMIOLOGY, REVIEW, 4843

IETHYLAMINE, 2,2'-DICHLORO-N-METHYL-
    BACILLUS SUBTILIS
        MUTAGENIC ACTIVITY, 4883
        SCREENING METHOD, 4883

IETHYLAMINE, N-NITROSO-
    BARBITURIC ACID, 5-ETHYL-5-PHENYL-
        DEALKYLATION, RAT, 4899
    CHOLANTHRENE, 3-METHYL-
        DEALKYLATION, RAT, 4899
    HEPATOMA
        CHROMOSOME ABERRATIONS, 4897
        CYTOTOXICITY TESTS, IMMUNOLOGIC, 5133*
        DNA, NEOPLASM, 4897
        NUCLEOPROTEINS, 4897
        RNA-DNA HYBRIDIZATION, 4897
        RNA, MESSENGER, 4897
        RNA, NEOPLASM, 4897
    LIVER NEOPLASMS
        CELL TRANSFORMATION, NEOPLASTIC, 4896
        POLYRIBOSOMES, 4896
    STOMACH NEOPLASMS
        P-CRESOL, 2,6-DI-TERT-BUTYL-, 4954*

IETHYLNITROSAMINE
    SEE DIETHYLAMINE, N-NITROSO-

IMETHYLAMINE, N-NITROSO-
    BARBITURIC ACID, 5-ETHYL-5-PHENYL-
        DEALKYLATION, RAT, 4899
    CHOLANTHRENE, 3-METHYL-
        DEALKYLATION, RAT, 4899
    MICROSOMES, LIVER
        ALKYLATION, 4895
    MUTAGENIC ACTIVITY, YEAST
        SCREENING METHOD, 4880

IMETHYLAMINOAZOBENZENE
    SEE ANILINE, N,N-DIMETHYL-P-PHENYLAZO-

IMETHYLBENZANTHRACENE
    SEE BENZ(A)ANTHRACENE, 7,12-DIMETHYL-

PHENOL OXIDASES
    ISOENZYMES
        MOUSE, COAT COLOR MUTANT, 5398*

DIPROPYLAMINE, N-NITROSO-
    BARBITURIC ACID, 5-ETHYL-5-PHENYL-
        DEALKYLATION, RAT, 4899
    CHOLANTHRENE, 3-METHYL-
        DEALKYLATION, RAT, 4899

DISGERMINOMA
    BRAIN NEOPLASMS
        CASE REPORT, 5182
        HISTOLOGICAL STUDY, 5182
        NEOPLASMS, MULTIPLE PRIMARY, 5182
    TURNER'S SYNDROME
        CASE REPORT, 5178
        KARYOTYPING, 5178

DNA
    ACETAMIDE
        CELL NUCLEUS, 4889
        CELL TRANSFORMATION, NEOPLASTIC, 4889
    ACETAMIDE, N-(ACETYLOXY)-N-9H-FLUOREN-2-YL-
        FLUORENE RING, ORIENTATION, 4933*
    ACETAMIDE, N-FLUOREN-2-YL-
        BINDING, 4932*
        CARCINOGENIC ACTIVITY, REVIEW, 4805
        CARCINOGENIC METABOLITE, 4932*
    ACETAMIDE, N-FLUOREN-2-YL-7-IODO-
        CARCINOGENIC ACTIVITY, REVIEW, 4805
    ACETAMIDE, THIO-
        CELL NUCLEUS, 4889
        CELL TRANSFORMATION, NEOPLASTIC, 4889
    AGING
        CELL CYCLE KINETICS, 5362*
    ANILINE, N,N-DIMETHYL-P-PHENYLAZO-
        BINDING, 4932*
        CARCINOGENIC METABOLITE, 4932*
    BENZ(A)ANTHRACENE
        BINDING, 4932*
        CARCINOGENIC METABOLITE, 4932*
    BENZ(A)ANTHRACENE, 7,12-DIMETHYL-
        BINDING, 4932*
        CARCINOGENIC METABOLITE, 4932*
    BENZ(A)ANTHRACENE, 7-METHYL-
        K-REGION EPOXIDES, 4911
        MICROSOMES, LIVER, 4911
    BENZO(A)PYRENE
        BINDING, 4938*
        CARCINOGENIC METABOLITE, 4908
        COVALENT COMPLEX, FLUORESCENCE SPECTRA, 4938*
        DIOL EPOXIDES, 4938*
        EPITHELIAL CELLS, 4908
    LIGHT
        MUTAGENIC ACTIVITY, 5363*
    MELANOMA
        THYMIDINE, 5384*
        URIDINE, 5-BROMO-2'-DEOXY-, 5384*
        URIDINE, 2'-DEOXY-5-ETHYL-, 5384*
    MYELOMA PROTEINS
        IMMUNOGLOBULIN FRAGMENTS, 5100
    2-NAPTHYLAMINE
        BINDING, 4932*
        CARCINOGENIC METABOLITE, 4932*
    NERVOUS SYSTEM NEOPLASMS
        HEPATOMA, 5372*

  - RADIATION, IONIZING
    - REVIEW, 4819
  - SMOKING
    - CELLS, CULTURED, 4952*
    - TOBACCO, 4952*
    - TOBACCO SUBSTITUTE, 4952*
  - ULTRAVIOLET RAYS
    - REVIEW, 4819
  - URIDINE, 5-BROMO-2'-DEOXY-
    - MUTAGENIC ACTIVITY, 5363*
  - VIRUS, POLYOMA
    - DNA REPLICATION, 5012
  - VIRUS, SV40
    - DNA REPLICATION, 5012

- DNA, CIRCULAR
  - VIRUS, HERPES SIMPLEX
    - DNA REPLICATION, 5086*
    - ISOLATION AND CHARACTERIZATION, 5086*
    - NUCLEIC ACID DENATURATION, 5086*
    - ULTRASTRUCTURAL STUDY, 5086*
  - VIRUS, POLYOMA
    - DNA-DNA HYBRIDIZATION, 5012
  - VIRUS, SV40
    - DNA-DNA HYBRIDIZATION, 5012

- DNA, NEOPLASM
  - HEPATOMA
    - DIETHYLAMINE, N-NITROSO-, 4897
  - L CELLS
    - URIDINE, 5-BROMO-2'-DEOXY-, 5365*
  - MAMMARY NEOPLASMS, EXPERIMENTAL
    - INSULIN, 5379*
    - LIPIDS, 5379*
  - OVARIAN NEOPLASMS
    - CARCINOMA, 5170
  - PLANT TUMORS
    - CELL NUCLEUS, 4950*
  - SARCOMA
    - URIDINE, 5-BROMO-2'-DEOXY-, 5365*
  - UROGENITAL NEOPLASMS
    - CARCINOMA, 5170
    - GRANULOSA CELL TUMOR, 5170
    - TERATOID TUMOR, 5170
  - VIRUS, AVIAN MYELOBLASTOSIS
    - TRANSFORMATION, GENETIC, 4992
  - VIRUS, AVIAN SARCOMA
    - TRANSFORMATION, GENETIC, 4992
  - VIRUS, ROUS SARCOMA
    - TRANSFORMATION, GENETIC, 4992

- DNA NUCLEOTIDYLTRANSFERASES
  - ANTINEOPLASTIC AGENTS
    - EMBRYO, MOUSE, 5034
  - CARCINOMA, EHRLICH TUMOR
    - CELL CYCLE KINETICS, 5353
    - CHALONES, 5397*
  - GLOBIN
    - DNA REPLICATION, 5351
  - MAMMARY NEOPLASMS, EXPERIMENTAL
    - CELL CYCLE KINETICS, 5353
  - SARCOMA
    - VIRUS, ROUS SARCOMA, 4993
  - SARCOMA 180, CROCKER
    - CELL CYCLE KINETICS, 5353
  - VIRUS, B77
    - TEMPERATURE SENSITIVE MUTANTS, 4996
  - VIRUS, MURINE MAMMARY TUMOR
    - DNA REPLICATION, 5064*
    - ISOLATION AND CHARACTERIZATION, 5064*
  - VIRUS, RAUSCHER MURINE LEUKEMIA
    - REVERSE TRANSCRIPTASE, 4996
  - VIRUS, ROUS SARCOMA
    - MITOCHONDRIA, 4993
    - TEMPERATURE SENSITIVE MUTANTS, 4996

- DNA POLYMERASE
  - SEE ALSO DNA NUCLEOTIDYLTRANSFERASES
  - GLOBIN
    - DNA REPLICATION, 5351
  - LEUKEMIA, MYELOBLASTIC
    - DIAGNOSIS AND PROGNOSIS, 5352

- DNA REPAIR
  - SKIN NEOPLASMS
    - ULTRAVIOLET RAYS, 4817
  - ULTRAVIOLET RAYS
    - REVIEW, 4817
    - XERODERMA PIGMENTOSUM, 5159
  - XERODERMA PIGMENTOSUM
    - CASE REPORT, 5159

- DNA REPLICATION
  - CARCINOMA, EHRLICH TUMOR
    - CHALONES, 5397*
  - CELLS, CULTURED
    - CELL DENSITITY, 5348
    - ENZYMATIC ACTIVITY, 5373*
  - CHALONES
    - CELL CYCLE KINETICS, 5396*
    - CONNECTIVE TISSUE, HAMSTER, 5396*
    - EPIDERMIS, 5333
    - EPITHELIUM, HAMSTER, 5396*
  - CYTOPLASM
    - REVIEW, 4858
  - DNA NUCLEOTIDYLTRANSFERASES
    - GLOBIN, 5351
  - DNA POLYMERASE
    - GLOBIN, 5351
  - FIBROBLASTS
    - ASCORBIC ACID, 5381*, 5382*
    - CELL DENSITITY, 5348
    - EPIDERMAL GROWTH FACTOR, 5381*
    - ESTERASES, 5381*
    - GROWTH SUBSTANCES, 5381*, 5382*
    - PROLINE, 4-HYDROXY-, 5381*
  - MAMMARY NEOPLASMS, EXPERIMENTAL
    - BENZ(A)ANTHRACENE, 7,12-DIMETHYL-, 4910
    - ESTRUS, 4910
  - PROTEINS
    - FIBROBLASTS, HUMAN, 5400*
  - REVERSE TRANSCRIPTASE
    - GLOBIN, 5351
  - SARCOMA
    - LYMPH NODES, 5118*
  - VIRUS, ADENO 2
    - CELL TRANSFORMATION, NEOPLASTIC, 5023
    - RNA REPLICATION, 5023
  - VIRUS, ADENO 7
    - CELL TRANSFORMATION, NEOPLASTIC, 5023
  - VIRUS, ADENO 12

    - CELL TRANSFORMATION, NEOPLASTIC, 5023
  - VIRUS, HERPES SIMPLEX
    - DNA, CIRCULAR, 5086*
  - VIRUS, MURINE MAMMARY TUMOR
    - DNA NUCLEOTIDYLTRANSFERASES, 5064*
  - VIRUS, MYCOPLASMA
    - RIFAMPICIN, 5029
    - VIRUS REPLICATION, 5029
  - VIRUS, POLYOMA
    - CARBOXY-LYASES, 5074*
    - DNA, 5012
    - POLYAMINES, 5074*
  - VIRUS, ROUS SARCOMA
    - CELL TRANSFORMATION, NEOPLASTIC, 5036*
    - ETHANOL, 2-MERCAPTO-, 5036*
    - MITOCHONDRIA, 5036*
    - TEMPERATURE SENSITIVE MUTANTS, 5036*
  - VIRUS, SV40
    - CELL TRANSFORMATION, NEOPLASTIC, 5393*
    - DNA, 5012

A, SINGLE-STRANDED
  - VIRUS, ADENO 1
    - NUCLEOPROTEINS, 5080*
  - VIRUS, SV15
    - NUCLEOPROTEINS, 5080*

A, VIRAL
  - HELA CELLS
    - VIRUS, ADENO 2, 5081*
  - MULTIPLE MYELOMA
    - IMMUNOGLOBULINS, 5144*
  - NASOPHARYNGEAL NEOPLASMS
    - VIRUS, EPSTEIN-BARR, 5027
  - VIRUS, ADENO 1
    - NUCLEOPROTEINS, 5080*
  - VIRUS, ADENO 2
    - VIRAL PROTEINS, 5023
  - VIRUS, ADENO 5
    - DNA-RNA HYBRIDIZATION, 5085*
  - VIRUS, BOVINE LEUKEMIA
    - DNA-RNA HYBRIDIZATION, 5004
  - VIRUS, EPSTEIN-BARR
    - CELL TRANSFORMATION, NEOPLASTIC, 5091*
    - B-LYMPHOCYTES, 5091*
  - VIRUS, HERPES SIMPLEX 1
    - ENDONUCLEASES, 5082*
  - VIRUS, HERPES SIMPLEX 2
    - ENDONUCLEASES, 5082*
  - VIRUS, POLYOMA
    - CELL TRANSFORMATION, NEOPLASTIC, 5076*
    - TEMPERATURE SENSITIVE MUTANTS, 5076*
    - VIRUS REPLICATION, 5076*
  - VIRUS, SV15
    - NUCLEOPROTEINS, 5080*
  - VIRUS, SV40
    - ENDONUCLEASES, 5008
    - TEMPERATURE SENSITIVE MUTANTS, 5008

OSOPHILA
  - INSECTICIDES, ORGANOPHOSPHATE
    - MUTAGENIC ACTIVITY, REVIEW, 4801

DRUG THERAPY, COMBINATION
  - ARTHRITIS, RHEUMATOID
    - CELL TRANSFORMATION, NEOPLASTIC, 4946*
    - SIDE EFFECTS, 4946*

DRUGS
  - ULTRAVIOLET RAYS
    - IMMUNE RESPONSE, REVIEW, 4864*

DUODENAL ULCER
  - LACTATE DEHYDROGENASE
    - ISOENZYMES, 5229*

EHRLICH ASCITES CARCINOMA
  - SEE CARCINOMA, EHRLICH TUMOR

ELASTIC TISSUE
  - SKIN NEOPLASMS
    - CARCINOMA, BASAL CELL, 5157
  - UTERINE NEOPLASMS
    - CELL DIFFERENTIATION, 5171
    - PRECANCEROUS CONDITIONS, 5171

ELEMENTS
  - LEUKEMIA, LYMPHOCYTIC
    - ULTRASTRUCTURAL STUDY, 5259*
  - LEUKEMIA, MONOBLASTIC
    - ULTRASTRUCTURAL STUDY, 5259*

ENDOCRINE GLAND NEOPLASMS
  - ADENOMA
    - EPIDEMIOLOGY, HAMSTER, 5276
  - APUD CELL CONCEPT
    - REVIEW, 4853
  - CARCINOMA
    - EPIDEMIOLOGY, HAMSTER, 5276
  - GENETICS
    - PRECANCEROUS CONDITIONS, 5160
  - ISLET CELL TUMOR
    - EPIDEMIOLOGY, HAMSTER, 5276
  - PHEOCHROMOCYTOMA
    - EPIDEMIOLOGY, HAMSTER, 5276

ENDOMETRIOSIS
  - APPENDICEAL NEOPLASMS
    - CELL DIFFERENTIATION, 4846
    - REVIEW, 4846
  - URETHRAL NEOPLASMS
    - CELL DIFFERENTIATION, 4846
    - REVIEW, 4846

ENDOMETRIUM
  - UTERINE NEOPLASMS
    - EPIDEMIOLOGY, JAPAN, 5314*

ENDONUCLEASES
  - VIRUS, HERPES SIMPLEX 1
    - DNA, VIRAL, 5082*
  - VIRUS, HERPES SIMPLEX 2
    - DNA, VIRAL, 5082*
  - VIRUS, SV40
    - DNA, VIRAL, 5008

ENVIRONMENTAL HAZARD
  - BENZO(A)PYRENE
    - DOSE-RESPONSE STUDY, 4929*

- ENZYMES
  - 8-AZAGUANINE
    - MUTAGENIC ACTIVITY, HAMSTER CELLS, 4918
  - GUANIDINE, 1-METHYL-3-NITRO-1-NITROSO-
    - MUTAGENIC ACTIVITY, HAMSTER CELLS, 4918

- EPINEPHRINE
  - HEPATOMA
    - ANTIBODIES, NEOPLASM, 5133*
    - CYTOTOXICITY TESTS, IMMUNOLOGIC, 5133*
  - MELANOMA
    - ADENOSINE CYCLIC 3',5' MONOPHOSPHATE, 5388*

- ERYTHREMIC MYELOSIS
  - IMMUNOSUPPRESSION
    - CASE REPORT, 5237*
    - PREGNA-1,4-DIENE-3,11,20-TRIONE, 17,21-DIHYDROXY-, 5237*
    - PURINE, 6-((1-METHYL-4-NITROIMIDAZOL-5-YL)THIO)-, 5237*
  - TRANSPLANTATION, HOMOLOGOUS
    - CASE REPORT, 5237*

- ERYTHRODERMA
  - T-LYMPHOCYTES
    - BRAIN, 5106

- ERYTHROLEUKEMIA
  - CELL DIFFERENTIATION
    - ACETIC ACID, 4998
    - HEMATOPOIETIC STEM CELLS, 5291
    - METHANE, SULFINYLBIS-, 4998
    - PLACENTAL EXTRACTS, 4998
  - HEMIN
    - CELL CYCLE KINETICS, 5350
    - GLOBIN, 5350
    - RNA, MESSENGER, 5350
  - HEMOGLOBINS
    - ACETIC ACID, 4998
    - METHANE, SULFINYLBIS-, 4998
    - PLACENTAL EXTRACTS, 4998
  - METHANE, SULFINYLBIS-
    - CELL CYCLE KINETICS, 5349, 5350
    - GLOBIN, 5349, 5350
    - RNA, MESSENGER, 5349, 5350
  - RNA, MESSENGER
    - RNA-DNA HYBRIDIZATION, 5349
  - VIRUS, FRIEND MURINE LEUKEMIA
    - CELL DIFFERENTIATION, 5045*
    - HEMOGLOBINS, 4998
  - VIRUS, MURINE LEUKEMIA
    - HEMATOPOIETIC STEM CELLS, 5046*

- ESCHERICHIA COLI
  - INSECTICIDES, ORGANOPHOSPHATE
    - MUTAGENIC ACTIVITY, REVIEW, 4801

- ESOPHAGEAL NEOPLASMS
  - BENZENE, 1,2-METHYLENEDIOXY-4-PROPYL-
    - ISOLATION AND CHARACTERIZATION, 4807
  - DIAPHRAGMATIC HERNIA
    - CASE REPORT, 5247*
  - ETHNIC GROUPS
    - EPIDEMIOLOGY, SINGAPORE, 5292*
  - OPIUM
    - EPIDEMIOLOGY, IRAN, 5315*
  - SOCIOECONOMIC FACTORS
    - EPIDEMIOLOGY, IRAN, 5315*

- ESTERASES
  - FIBROBLASTS
    - DNA REPLICATION, 5381*
  - IMMUNOLOGIC DEFICIENCY SYNDROMES
    - COMPLEMENT, 5150

- ESTRADIOL
  - 5ALPHA-ANDROSTAN-3-ONE, 17BETA-HYDROXY-
    - VAGINA, 4886
  - MAMMARY NEOPLASMS, EXPERIMENTAL
    - CELL DIFFERENTIATION, 5390*
  - PEROXIDASES
    - ISOLATION AND CHARACTERIZATION, 5360
    - UTERUS, RAT, 5360

- ESTROGENS
  - BREAST NEOPLASMS
    - MENOPAUSE, 5166
    - MENSTRUATION, 5166
    - SEX CHROMATIN, 5166
  - BRONCHIAL NEOPLASMS
    - GLYCOPROTEINS, 5167
  - MUTAGENIC ACTIVITY
    - REVIEW, 4854
  - RECEPTORS, HORMONE
    - ISOLATION AND CHARACTERIZATION, REVIEW, 5361
  - UROGENITAL NEOPLASMS
    - GLYCOPROTEINS, 5167
  - UTERINE NEOPLASMS
    - EPIDEMIOLOGY, 4855
    - MENOPAUSE, 4855

- ESTRUS
  - MAMMARY NEOPLASMS, EXPERIMENTAL
    - BENZ(A)ANTHRACENE, 7,12-DIMETHYL-, 4910
    - DNA REPLICATION, 4910
    - PROLACTIN, 4910

- ETHANE, 1,1,1-TRICHLORO-2,2-BIS(P-CHLOROPHENYL)-
  - RETINOL
    - CYTOCHROME P-450, 4890
    - DOSE RESPONSE STUDY, 4890
  - CYTOCHROME P-450
    - METABOLISM, PIG, 4885
  - RETINOL
    - METABOLISM, PIG, 4885

- ETHANOL, 2-MERCAPTO-
  - VIRUS, MENGO
    - VIRAL PROTEINS, 5030
  - VIRUS, ROUS SARCOMA
    - DNA REPLICATION, 5036*

- ETHIDIUM BROMIDE
  - BACILLUS SUBTILIS
    - MUTAGENIC ACTIVITY, 4883
    - SCREENING METHOD, 4883

- ETHNIC GROUPS

  BREAST NEOPLASMS
    EPIDEMIOLOGY, SINGAPORE, 5292*
  ESOPHAGEAL NEOPLASMS
    EPIDEMIOLOGY, SINGAPORE, 5292*
  GYNECOLOGIC NEOPLASMS
    EPIDEMIOLOGY, AZERBAIJAN SSR, 5273
  LUNG NEOPLASMS
    EPIDEMIOLOGY, SINGAPORE, 5292*
  NASOPHARYNGEAL NEOPLASMS
    EPIDEMIOLOGY, SINGAPORE, 5292*
  STOMACH NEOPLASMS
    EPIDEMIOLOGY, SINGAPORE, 5292*

ETHYLAMINE, N-METHYL-N-NITROSO-
  MICROSOMES, LIVER
    ALKYLATION, 4895

ETHYLENE, CHLORO-
  LEUKOPENIA
    OCCUPATIONAL HAZARD, 5191
  LIVER NEOPLASMS
    ANGIOSARCOMA, 5193
    ANTIBODIES, 5191
    HEMANGIOENDOTHELIOMA, 5191
    HISTOLOGICAL STUDY, 5192, 5193
    OCCUPATIONAL HAZARD, 5191, 5192
    PRECANCEROUS CONDITIONS, 5191, 5192
  OCCUPATIONAL HAZARD
    CONTROL TECHNOLOGY, 4860*

THYLENE, CHLORO POLYMER
  ANGIOSARCOMA
    OCCUPATIONAL HAZARD, 5284
  LIVER NEOPLASMS
    ANGIOSARCOMA, 5284

THYLENE, TRICHLORO-
  BARBITURIC ACID, 5-ETHYL-5-PHENYL-
    METABOLISM, 4887
  MICROSOMES, LIVER
    METABOLISM, 4887
  4H-NAPHTHO(1,2-B)PYRAN-4-ONE, 2-PHENYL-

    METABOLISM, 4887
  PROPANE, 1,1,1-TRICHLORO-2,3-EPOXY-
    METABOLISM, 4887
  VALERIC ACID, 2,2-DIPHENYL-, 2-(DIETHYLAMINO)ETHYL ESTER
    METABOLISM, 4887

XTRACHROMOSOMAL INHERITANCE
  AGROBACTERIUM TUMEFACIENS
    PLANT TUMORS, 4881

YE NEOPLASMS
  LYMPHOMA
    REVIEW, 5152
  PLASMACYTOMA
    REVIEW, 5152
  RETINOBLASTOMA
    VIRUS, ADENO 12, 5024

YELID NEOPLASMS
  HEMANGIOMA
    CASE REPORT, INFANT, 5153
    DIAGNOSIS AND CLASSIFICATION, 5153
  LYMPHOMA
    REVIEW, 5152

FATTY ACIDS
  HEPATOMA
    STEARIC ACID, 5342

FETAL GLOBULINS
  HEPATOMA
    CONCANAVALIN A, 5103
    IMMUNE SERUMS, 5103
    IMMUNOSUPPRESSION, 5103
    LYMPHOCYTE TRANSFORMATION, 5103
    PLANT AGGLUTININS, 5103
    ROSETTE FORMATION, 5103
  STOMACH NEOPLASMS
    ADENOCARCINOMA, 5359
    CASE REPORT, 5359
    DIAGNOSIS AND PROGNOSIS, 5201

FETUS
  4,4'-STILBENEDIOL, ALPHA,ALPHA'-DIETHYL-
    METABOLISM, MOUSE, 4945*

FIBRINOLYSIS
  SARCOMA
    CYCLOHEXANECARBOXYLIC ACID, 4-(AMINOMETHYL)-, 5211

FIBROBLASTS
  AGING
    DNA, 5362*
  ASCORBIC ACID
    DNA REPLICATION, 5381*, 5382*
  CARBOHYDRATES
    ADENINE NUCLEOTIDES, 5343
    HEXOKINASE, 5343
    NAD, 5343
  CELL ADHESION
    ULTRASTRUCTURAL STUDY, 4879*
  CELLS, CULTURED
    CELL ADHESION, 4879*
    CELL TRANSFORMATION, NEOPLASTIC, 5376*
    GROWTH, 5380*
    SURFACE PROPERTIES, 5380*
  CELLULOSE, METHYL ETHER
    GROWTH, 5380*
    SURFACE PROPERTIES, 5380*
  DNA REPLICATION
    CELL DENSITY, 5348
    EPIDERMAL GROWTH FACTOR, 5381*, 5382*
  ESTERASES
    DNA REPLICATION, 5381*
  GROWTH SUBSTANCES
    DNA REPLICATION, 5381*, 5382*
  PROLINE, 4-HYDROXY-
    DNA REPLICATION, 5381*

FIBROMA
  URETERAL NEOPLASMS
    CASE REPORT, 5231*

FIBROSARCOMA
  BRADYKININ
    NEOPLASM TRANSPLANTATION, 5067*
  CARBOXY-LYASES
    NEOPLASM TRANSPLANTATION, 5067*
  CHOLANTHRENE, 3-METHYL-
    NEOPLASM METASTASIS, 5265*

  - NEOPLASM METASTASIS
    - CELL LINE, 5376*
    - TUMCR CELL SUB-POPULATIONS, 5265*
  - VIRUS, HERPES SIMPLEX 2
    - ANTIGENS, VIRAL, 5089*
    - RADIATION, NON-IONIZING, 5089*
    - VIRUS INACTIVATION, PHOTODYNAMIC, 5089*
  - VIRUS, SV40
    - BRADYKININ, 5067*
    - CARBOXY-LYASES, 5067*

- FLUORANTHENE
  - AIR POLLUTANTS
    - AUTOMOBILE EXHAUST, 5287

- FLUORENE, 2-NITROSO-
  - BACILLUS SUBTILIS
    - MUTAGENIC ACTIVITY, 4883
    - SCREENING METHOD, 4883

- FLUORENYL ACETAMIDE
  - SEE ACETAMIDE, N-FLUOREN-2-YL-

- FOOD CONTAMINATION
  - AFLATCXIN B1
    - ASPERGILLUS FLAVUS, 4948*
    - FLUORESCENT PATTERNS, 4948*
    - INSECTS, 4948*
  - PYRROLIDINE, 1-NITROSO-
    - NITRIC ACID, SODIUM SALT, 4953*
    - PROLINE, 4953*
    - PUTRESCINE, 4953*

- FOREIGN BODIES
  - GUANIDINE, 1-METHYL-3-NITRO-1-NITROSO-
    - CARCINOGENIC ACTIVITY, RAT, 4921

- FORMAMIDE, N-(4-(5-NITRO-2-FURANYL)-2-THIAZOLYL)-
  - BLADDER NEOPLASMS
    - ULTRASTPUCTURAL STUDY, RAT, 4892
  - EPITHELIAL CELLS
    - ULTRASTRUCTURAL STUDY, RAT, 4892

- GALACTOSIDASES
  - STOMACH NEOPLASMS
    - DIAGNCSIS AND PROGNOSIS, 5201

- GALLBLADDER NEOPLASMS
  - ATAXIA TELANGIECTASIA
    - EPIDEMIOLOGY, 5317*
    - GENETICS, 5317*
  - EPIDEMIOLOGY
    - ALASKA, NATIVES, 5294*
  - GRANULOMA
    - CEROID-LIKE PIGMENTS, 5206
    - HISTIOCYTES, 5206
    - ULTRASTRUCTURAL STUDY, 5206

- GAMMA GLOBULINS
  - LEUKEMIA, MYELOBLASTIC
    - IMMUNOGLOBULINS, SURFACE, 5145*

- GANGLIA
  - VIRUS, HERPES SIMPLEX
    - VIRUS REPLICATION, 4867*

- GASTRECTOMY
  - GASTRIC MUCOSA
    - HISTOLOGICAL STUDY, 5233*
  - STOMACH NEOPLASMS
    - DIAGNOSIS AND PROGNOSIS, 5303*
    - EPIDEMIOLOGY, 5233*, 5303*
    - EPIDEMIOLOGY, EAST GERMANY, 5267
    - PRECANCEROUS CONDITIONS, 5233*

- GASTRIC MUCOSA
  - GASTRECTOMY
    - HISTOLOGICAL STUDY, 5233*

- GASTRIN
  - STOMACH NEOPLASMS
    - DIAGNOSIS AND PROGNOSIS, 5201

- GASTRITIS
  - SOY SAUCE
    - CARCINOGENIC POTENTIAL, RAT, 4955*
  - STOMACH NEOPLASMS
    - EPIDEMIOLOGY, EAST GERMANY, 5267
    - LACTATE DEHYDROGENASE, 5229*

- GASTROINTESTINAL NEOPLASMS
  - ASBESTOS
    - EPIDEMIOLOGY, 4930*
    - OCCUPATIONAL HAZARD, 4930*, 5286
  - CARCINOGEN, CHEMICAL
    - EPIDEMIOLOGY, REVIEW, 4878*
  - CELIAC DISEASE
    - EPIDEMIOLOGY, 5316*
  - DIET
    - EPIDEMIOLOGY, REVIEW, 4878*
  - EPIDEMIOLOGY
    - UNITED STATES, 5320*
    - UTAH, 5293*
  - GENETICS
    - EPIDEMIOLOGY, REVIEW, 4878*

- GENES
  - ALANINE
    - CELL CYCLE KINETICS, 5363*

- GENETICS
  - BREAST NEOPLASMS
    - EPIDEMIOLOGY, 5312*
    - EPIDEMIOLOGY, REVIEW, 4851
    - RISK ANALYSIS, 5312*
  - CHORIOCARCINOMA
    - CELL FUSION, 5364*
    - HYBRID CELLS, 5364*
  - COLONIC NEOPLASMS
    - ADENOCARCINOMA, 5199
    - EPIDEMIOLOGY, REVIEW, 5268
  - ENDOCRINE GLAND NEOPLASMS
    - PRECANCEROUS CONDITIONS, 5160
  - EPIDEMIOLOGY
    - ATAXIA TELANGIECTASIA, 5317*
  - GALLBLADDER NEOPLASMS
    - ATAXIA TELANGIECTASIA, 5317*
  - GASTROINTESTINAL NEOPLASMS
    - EPIDEMIOLOGY, REVIEW, 4878*
  - HEART NEOPLASMS
    - CASE REPORT, 5244*
    - MYXOMA, 5244*
  - HEPATOMA
    - ACETAMIDE, N-FLUOREN-2-YL-, 4888
    - ACETAMIDE, N-FLUOREN-2-YLDI-, 488
  - HODGKIN'S DISEASE

        CASE REPORT, 5263*
        HISTOCOMPATIBILITY ANTIGENS, 5263*
    INTESTINAL NEOPLASMS
        ADENOCARCINOMA, 5199
    LEUKEMIA
        EPIDEMIOLOGY, REVIEW, 4877*
    LEUKEMIA, LYMPHOBLASTIC
        HYPERSENSITIVITY, DELAYED, 5128*
    LIVER CIRRHOSIS
        ACETAMIDE, N-FLUOREN-2-YL-, 4888
        ACETAMIDE, N-FLUOREN-2-YLDI-, 4888
    MOSAICISM
        IMMUNE RESPONSE, MOUSE, 4832
    MYELOMA PROTEINS
        DNA-RNA HYBRIDIZATION, 5100
        IMMUNOGLOBULIN FRAGMENTS, 5100
    NEOPLASMS
        CHROMOSOME ABERRATIONS, 5180
        EPIDEMIOLOGY, 5313*
    NEOPLASMS, MULTIPLE PRIMARY
        EPIDEMIOLOGY, REVIEW, 4840
    OVARIAN NEOPLASMS
        ATAXIA TELANGIECTASIA, 5317*
    PANCREATIC NEOPLASMS
        RISK FACTORS, 5306*
    PITUITARY NEOPLASMS
        ADENOMA, CHROMOPHOBE, 5216*
    RETINOBLASTOMA
        AGE FACTORS, 5243*
        PENETRANCE ANALYSIS, 5243*
    SKIN NEOPLASMS
        REVIEW, 4847
    STOMACH NEOPLASMS
        ADENOMA, 5200
        INTESTINAL POLYPS, 5200
    THYROID NEOPLASMS
        ADRENAL GLAND NEOPLASMS, 5160
    VIRUS, ADENO 2
        REVIEW, 4823
    VIRUS, FRIEND SPLEEN FOCUS-FORMING
        IMMUNE RESPONSE, 5043*
        NEOPLASM TRANSPLANTATION, 5043*
        VIRUS REPLICATION, 5043*
    XERODERMA PIGMENTOSUM
        CASE REPORT, 5159

ERM CELLS
    RADIATION
        CHROMOSOME ABERRATIONS, 4862*

LASS
    NEOPLASMS, EXPERIMENTAL
        FIBER STRUCTURE, 4931*

LIOBLASTOMA MULTIFORME
    CHOLESTEROL
        ULTRASTRUCTURAL STUDY, 5184
    NEOPLASM TRANSPLANTATION
        HISTOLOGICAL STUDY, ATHYMIC MOUSE,
          5185

LIOMA
    LYMPHOCYTES
        IMMUNITY, CELLULAR, 5113*
    UREA, METHYL NITROSO-
        IMMUNITY, CELLULAR, 5113*

LOBIN
    DNA NUCLEOTIDYLTRANSFERASES
        DNA REPLICATION, 5351
    DNA POLYMERASE
        DNA REPLICATION, 5351
    ERYTHROLEUKEMIA
        HEMIN, 5350
        METHANE, SULFINYLBIS-, 5349, 5350
    REVERSE TRANSCRIPTASE
        DNA REPLICATION, 5351

GLOBULINS
    VIRUS, ADENO 2
        ANTIGENS, NEOPLASM, 5079*

GLOMANGIOMA
    HEART NEOPLASMS
        CASE REPORT, 5186
        ULTRASTRUCTURAL STUDY, 5186

GLUCOSE
    HEPATOMA
        METABOLISM, RAT LIVER, 5371*
    VIRUS, ROUS SARCOMA
        CELL TRANSFORMATION, NEOPLASTIC,
          5378*
        METABOLISM, 5378*

GLUCOSEPHOSPHATASE
    HEPATOMA
        CHOLANTHRENE, 3-METHYL-, 4987
        CORTISOL, 4987
        INSULIN, 4987

GLUCOSEPHOSPHATE DEHYDROGENASE
    HEPATOMA
        CHOLANTHRENE, 3-METHYL-, 4987
        CORTISOL, 4987
        INSULIN, 4987

GLUTAMIC ACID
    HEPATOMA
        METABOLISM, RAT LIVER, 5371*

GLUTAMINE
    HEPATOMA
        METABOLISM, RAT LIVER, 5371*

GLUTAMYL TRANSPEPTIDASE
    LEUKEMIA, LYMPHOCYTIC
        B-LYMPHOCYTES, 5356
        T-LYMPHOCYTES, 5356
    MULTIPLE MYELOMA
        B-LYMPHOCYTES, 5356
        T-LYMPHOCYTES, 5356

GLYCOLYSIS
    HEPATOMA
        CELL DIFFERENTIATION, 5334
        CELL TRANSFORMATION, NEOPLASTIC,
          5371*
    VIRUS, SV40
        CELL TRANSFORMATION, NEOPLASTIC,
          5343

GLYCOPEPTIDES
    ACTINOMYCIN D
        CELL TRANSFORMATION, NEOPLASTIC,
          5395*
    CELL MEMBRANE
        CELL TRANSFORMATION, NEOPLASTIC,

5395*

GLYCOPROTEINS
  ANTIGENS, NEOPLASM
    CELL MEMBRANE, 5129*
  BRONCHIAL NEOPLASMS
    ESTROGENS, 5167
  L CELLS
    ADENOSINE TRIPHOSPHATASE, 5399*
    CALCIUM, 5399*
    MICROTUBULES, 5399*
  LYMPHOSARCOMA
    CELL MEMBRANE, 5261*
  SARCOMA, RETICULUM CELL
    CELL MEMBRANE, 5261*
  STOMACH NEOPLASMS
    DIAGNOSIS AND PROGNOSIS, 5201
  UROGENITAL NEOPLASMS
    ESTROGENS, 5167
  VIRUS, MURINE MAMMARY TUMOR
    TRYPSIN, 5066*

GOLGI APPARATUS
  VIRUS, FRIEND MURINE LEUKEMIA
    CELL TRANSFORMATION, NEOPLASTIC, 5050*
  VIRUS, ROUS SARCOMA
    CELL TRANSFORMATION, NEOPLASTIC, 5050*

GONADS
  CARBAMIC ACID, ETHYL ESTER
    EMBRYO, MOUSE, 4941*

GONORRHEA
  CERVIX NEOPLASMS
    EPIDEMIOLOGY, 5177

GRANULOMA
  GALLBLADDER NEOPLASMS
    CEROID-LIKE PIGMENTS, 5206
    HISTIOCYTES, 5206
    ULTRASTRUCTURAL STUDY, 5206

GRANULOSA CELL TUMOR
  GYNECOLOGIC NEOPLASMS
    ULTRASTRUCTURAL STUDY, REVIEW, 4850
  OVARIAN NEOPLASMS
    RADIATION, IONIZING, 4965
  UROGENITAL NEOPLASMS
    CELL CYCLE KINETICS, 5170
    DNA, NEOPLASM, 5170
    KARYOTYPING, 5170

GROWTH
  FIBROBLASTS
    CELLS, CULTURED, 5380*
    CELLULOSE, METHYL ETHER, 5380*
  L CELLS
    ANTI-ANTIBODIES, 5136*
    COMPLEMENT, 5136*
  MELANOMA
    ADENOSINE CYCLIC 3',5' MONOPHOSPHATE, 5385*
    DIBUTYRYL CYCLIC AMP, 5385*
    MSH, 5385*

GROWTH SUBSTANCES
  BLOOD PLATELETS
    ISOLATION AND CHARACTERIZATION, 5337
  FIBROBLASTS
    DNA REPLICATION, 5381*, 5382*
  HEPATOMA
    ISOLATION, SERUM, 5383*
    MICROSOMES, LIVER, 5383*
    PROTEINS, 5347
  VIRUS, ROUS SARCOMA
    CELL TRANSFORMATION, NEOPLASTIC, 4990
    ISOLATION AND CHARACTERIZATION, 4990

GUANIDINE, 1-ETHYL-3-NITRO-1-NITROSO-
  CARCINOMA 256, WALKER
    IMMUNE RESPONSE, RAT, 4916
    IMMUNITY, CELLULAR, 4916
  STOMACH NEOPLASMS
    ADENOCARCINOMA, 4919
    CARCINOMA 256, WALKER, 4916
    IMMUNE RESPONSE, RAT, 4916
    NEOPLASM TRANSPLANTATION, 4919

GUANIDINE, 1-METHYL-3-NITRO-1-NITROSO-
  BACILLUS SUBTILIS
    MUTAGENIC ACTIVITY, 4883
    SCREENING METHOD, 4883
  ENZYMES
    MUTAGENIC ACTIVITY, HAMSTER CELLS, 4918
  FOREIGN BODIES
    CARCINOGENIC ACTIVITY, RAT, 4921
  HYPERBARIC OXYGENATION
    MUTAGENIC ACTIVITY, 4882
  INTESTINAL NEOPLASMS
    CARCINOGENIC ACTIVITY, DOG, 4920
    CARCINOGENIC ACTIVITY, RAT, 4921
    LEIOMYOSARCOMA, 4920, 4921
  MUTAGENIC ACTIVITY, YEAST
    SCREENING METHOD, 4880
  SALMONELLA TYPHIMURIUM
    HYPERBARIC OXYGENATION, 4882
  STOMACH NEOPLASMS
    ADENOCARCINOMA, 4921
    CARCINOGENIC ACTIVITY, DOG, 4920
    CARCINOGENIC ACTIVITY, RAT, 4921
    CARCINOMA, 4920
    PRECANCEROUS CONDITIONS, 4921
    SARCOMA, 4920, 4921

GUANIDINES
  AGROBACTERIUM TUMEFACIENS
    PLANT TUMORS, 4881

GUANOSINE CYCLIC 3',5' MONOPHOSPHATE
  SKIN NEOPLASMS
    CELL DIFFERENTIATION, REVIEW, 4871*

GYNANDROBLASTOMA
  OVARIAN NEOPLASMS
    CASE REPORT, 5215*

GYNECOLOGIC NEOPLASMS
  ADENOCARCINOMA
    ULTRASTRUCTURAL STUDY, REVIEW, 4850

  - ASCORBIC ACID
    - PRECANCEROUS CONDITIONS, 5345
  - CARCINOMA
    - ULTRASTRUCTURAL STUDY, REVIEW, 4850
  - CYSTADENOMA, MUCINOUS
    - ULTRASTRUCTURAL STUDY, REVIEW, 4850
  - EPIDEMIOLOGY
    - UTAH, 5293*
  - ETHNIC GROUPS
    - EPIDEMIOLOGY, AZERBAIJAN SSR, 5273
  - GRANULOSA CELL TUMOR
    - ULTRASTRUCTURAL STUDY, REVIEW, 4850
  - HYPERPLASIA
    - ULTRASTRUCTURAL STUDY, REVIEW, 4850
  - LEIOMYOMA
    - ASCORBIC ACID, 5345
    - MALATE DEHYDROGENASE, 5345
    - PYRUVIC ACID, 5345
  - LEIOMYOSARCOMA
    - ULTRASTRUCTURAL STUDY, REVIEW, 4850
  - MALATE DEHYDROGENASE
    - PRECANCEROUS CONDITIONS, 5345
  - PARITY
    - EPIDEMIOLOGY, AZERBAIJAN SSR, 5273
  - PYRUVIC ACID
    - PRECANCEROUS CONDITIONS, 5345
  - SARCOMA
    - ULTRASTRUCTURAL STUDY, REVIEW, 4850

- YNECOMASTIA
  - MUCOPOLYSACCHARIDES
    - ISOLATION AND CHARACTERIZATION, 5344

- AMARTCMA
  - NEOPLASMS, MULTIPLE PRIMARY
    - CASE REPORT, 5252*
    - GENETICS, 5252*

- EAD AND NECK NEOPLASMS
  - CAROTID BODY TUMOR
    - CASE REPORT, 5250*
  - PARAGANGLIOMA, NONCHROMAFFIN
    - CASE REPORT, 5248*

- EART NEOPLASMS
  - ANGIOSARCOMA
    - CASE REPORT, 5245*
  - GENETICS
    - CASE REPORT, 5244*
  - GLOMANGIOMA
    - CASE REPORT, 5186
    - ULTRASTRUCTURAL STUDY, 5186
  - MESOTHELIOMA
    - CASE REPORT, 5245*
  - MYXOMA
    - CASE REPORT, 5244*
    - GENETICS, 5244*
  - RHABDOMYOMA
    - ULTRASTRUCTURAL STUDY, 5246*

- ELA CELLS
  - CHROMOSOME ABERRATIONS
    - REVIEW, 4873*
  - CHROMOSOMES
    - SATELLITE ASSOCIATION, 5179
  - INSECTICIDES, ORGANOPHOSPHATE
    - MUTAGENIC ACTIVITY, REVIEW, 4801
  - RNA, VIRAL
    - POLYADENYLATION, 5006
  - VIRUS, ADENO 2
    - DNA, VIRAL, 5081*
    - NUCLEOPROTEINS, 5081*
    - PEPTIDES, 5084*
    - RNA POLYMERASE, 5081*
  - VIRUS, RHINO
    - RNA, VIRAL, 5006

- HEMADSORPTION
  - VIRUS, INFLUENZA
    - ULTRASTRUCTURAL STUDY, 5037*

- HEMANGIOBLASTOMA
  - SEE ANGIOSARCOMA

- HEMANGIOENDOTHELIOMA
  - LIVER NEOPLASMS
    - ETHYLENE, CHLORO-, 5191
  - NEOPLASMS, VASCULAR TISSUE
    - EPIDEMIOLOGY, HAMSTER, 5277

- HEMANGIOMA
  - EYELID NEOPLASMS
    - CASE REPORT, INFANT, 5153
    - DIAGNOSIS AND CLASSIFICATION, 5153
  - NEOPLASMS, MULTIPLE PRIMARY
    - CASE REPORT, 5252*

- HEMATOPOIESIS
  - RADIATION, IONIZING
    - BONE MARROW CELLS, 4964

- HEMATOPOIETIC STEM CELLS
  - ERYTHROLEUKEMIA
    - CELL DIFFERENTIATION, 5291
    - VIRUS, MURINE LEUKEMIA, 5046*
  - LEUKEMIA
    - CELL DIFFERENTIATION, 4845
  - LEUKEMIA, MYELOCYTIC
    - CELL DIFFERENTIATION, 5254*, 5291
  - LEUKEMIA, PLASMACYTIC
    - CELL DIFFERENTIATION, 5291
  - UREA, METHYL NITROSO-
    - BONE MARROW CELLS, 4894
  - VIRUS, MURINE LEUKEMIA
    - CELL TRANSFORMATION, NEOPLASTIC, 5046*
    - TRANSPLANTATION IMMUNOLOGY, 5046*

- HEMIN
  - ERYTHROLEUKEMIA
    - CELL CYCLE KINETICS, 5350
    - GLOBIN, 5350
    - RNA, MESSENGER, 5350

- HEMOGLOBINS
  - ERYTHROLEUKEMIA
    - ACETIC ACID, 4998
    - METHANE, SULFINYLBIS-, 4998
    - PLACENTAL EXTRACTS, 4998
    - VIRUS, FRIEND MURINE LEUKEMIA, 4998

- HEMOPEXIN
  - PORPHYRIA
    - B-LYMPHOCYTES, 5104
    - T-LYMPHOCYTES, 5104

- HEMORRHAGE, GASTROINTESTINAL
  - PANCREATIC NEOPLASMS
    - EPIDEMIOLOGY, 5238*

- HEMORRHOIDS
  - SIGMOID NEOPLASMS
    - EPIDEMIOLOGY, 5230*

- HEPATITIS
  - HEPATOMA
    - EPIDEMIOLOGY, CALIFORNIA, 5305*
  - LIVER NEOPLASMS
    - EPIDEMIOLOGY, UNITED STATES, 5304*

- HEPATOCARCINOMA
  - SEE HEPATOMA

- HEPATOMA
  - ACETAMIDE, N-FLUOREN-2-YL-
    - CARCINOGENIC ACTIVITY, RAT, 4888
    - GENETICS, 4888
  - ACETAMIDE, N-FLUOREN-2-YLDI-
    - CARCINOGENIC ACTIVITY, RAT, 4888
    - GENETICS, 4888
  - ADENOSINE CYCLIC 3',5' MONOPHOSPHATE
    - PROTEIN KINASE, 5355
  - ALANINE
    - METABOLISM, RAT LIVER, 5371*
  - AMINO ACIDS
    - PROTEINS, 5347
  - ANILINE, N,N-DIMETHYL-P-PHENYLAZO-
    - ADENOSINE TRIPHOSPHATASE, 4891
    - ALKALINE PHOSPHATASE, 4891
    - EPITHELIAL CELLS, 4891
    - ULTRASTRUCTURAL STUDY, RAT, 4891
  - ANTIBODIES, NEOPLASM
    - CYTOTOXICITY TESTS, IMMUNOLOGIC, 5133*
  - AUSTRALIA ANTIGEN
    - EPIDEMIOLOGY, CALIFORNIA, 5305*
  - BENZENE, 4-ALLYL-1,2-(METHYLENEDIOXY)-
    - CARCINOGENIC ACTIVITY, RAT, MOUSE, 4807
    - ISOLATION AND CHARACTERIZATION, 4807
  - BENZENE, 1,2-(METHYLENEDIOXY)-4-PROPENYL-
    - CARCINOGENIC ACTIVITY, RAT, MOUSE, 4807
    - ISOLATION AND CHARACTERIZATION, 4807
  - BENZENE, 1,2-METHYLENEDIOXY-4-PROPYL-
    - CARCINOGENIC ACTIVITY, RAT, MOUSE, 4807
    - ISOLATION AND CHARACTERIZATION, 4807
  - BENZO(A)PYRENE
    - CELL TRANSFORMATION, NEOPLASTIC, 4909
  - BUTYRIC ACID, 2-AMINO-4-(ETHYLTHIO)-
    - ALDEHYDE OXIDOREDUCTASES, 4934*
  - CARBAMIC ACID, ETHYL ESTER
    - AGE FACTORS, MOUSE, 4941*
    - TRANSPLACENTAL CARCINOGENESIS, MOUSE, 4941*
  - CELL DIFFERENTIATION
    - ULTRASTRUCTURAL STUDY, 5190
  - CELL MEMBRANE
    - ULTRASTRUCTURAL STUDY, 5190
  - CELLULAR INCLUSIONS
    - ALCOHOLIC HYALINE, 5212*
    - ULTRASTRUCTURAL STUDY, 5212*
  - CHOLANTHRENE, 3-METHYL-
    - ARYL HYDROCARBON HYDROXYLASES, 4987
    - GLUCOSEPHOSPHATASE, 4987
    - GLUCOSEPHOSPHATE DEHYDROGENASE, 4987
  - CHOLESTEROL
    - COENZYME A, 5358
    - MICROSOMES, LIVER, 5358
  - CHROMATIN
    - HISTONES, 5346
    - PROTEINS, 5346
  - CITRIC ACID
    - METABOLISM, RAT LIVER, 5371*
  - CONTRACEPTIVES, ORAL
    - CASE REPORT, 5239*
  - CORTISOL
    - ANTIBODIES, NEOPLASM, 5133*
    - ARYL HYDROCARBON HYDROXYLASES, 4987
    - CYTOTOXICITY TESTS, IMMUNOLOGIC, 5133*
    - GLUCOSEPHOSPHATASE, 4987
    - GLUCOSEPHOSPHATE DEHYDROGENASE, 4987
  - CYCLOHEXIMIDE
    - CARBOXY-LYASES, 5357
    - PROTEINS, 5347
  - DEXAMETHASONE
    - CARBOXY-LYASES, 5357
    - TYROSINE AMINOTRANSFERASE, 5358
  - DIBUTYRYL CYCLIC AMP
    - CARBOXY-LYASES, 5357
  - DIETHYLAMINE, N-NITROSO-
    - CHROMOSOME ABERRATIONS, 4897
    - CYTOTOXICITY TESTS, IMMUNOLOGIC, 5133*
    - DNA, NEOPLASM, 4897
    - NUCLEOPROTEINS, 4897
    - RNA-DNA HYBRIDIZATION, 4897
    - RNA, MESSENGER, 4897
    - RNA, NEOPLASM, 4897
  - EPINEPHRINE
    - ANTIBODIES, NEOPLASM, 5133*
    - CYTOTOXICITY TESTS, IMMUNOLOGIC, 5133*
  - FETAL GLOBULINS
    - CONCANAVALIN A, 5103
    - IMMUNE SERUMS, 5103
    - IMMUNOSUPPRESSION, 5103
    - LYMPHOCYTE TRANSFORMATION, 5103
    - PLANT AGGLUTININS, 5103
    - ROSETTE FORMATION, 5103
  - GLUCOSE
    - METABOLISM, RAT LIVER, 5371*
  - GLUTAMIC ACID
    - METABOLISM, RAT LIVER, 5371*
  - GLUTAMINE
    - METABOLISM, RAT LIVER, 5371*
  - GLYCOLYSIS
    - CELL DIFFERENTIATION, 5334

    - CELL TRANSFORMATION, NEOPLASTIC, 5371*
  - GROWTH SUBSTANCES
    - ISOLATION, SERUM, 5383*
    - PROTEINS, 5347
  - HEPATITIS
    - EPIDEMIOLOGY, CALIFORNIA, 5305*
  - INSULIN
    - ANTIBODIES, NEOPLASM, 5133*
    - ARYL HYDROCARBON HYDROXYLASES, 4987
    - CYTOTOXICITY TESTS, IMMUNOLOGIC, 5133*
    - GLUCOSEPHOSPHATASE, 4987
    - GLUCOSEPHOSPHATE DEHYDROGENASE, 4987
    - PROTEINS, 5347
  - LACTIC ACID
    - METABOLISM, RAT LIVER, 5371*
  - LASIOCARPINE
    - CARCINOGENIC ACTICITY, RAT, 4808
    - ISOLATION AND CHARACTERIZATION, 4808
  - LIVER CIRRHOSIS
    - CLONORCHIASIS, 5194
  - MALIC ACID
    - METABOLISM, RAT LIVER, 5371*
  - MICROSOMES, LIVER
    - GROWTH SUBSTANCES, 5383*
  - MITOCHONDRIA, LIVER
    - PROTEIN KINASE, 5355
  - MYCOTOXINS
    - REVIEW, 4812
  - NERVOUS SYSTEM NEOPLASMS
    - DNA, 5372*
    - DNA-RNA HYBRIDIZATION, 5372*
    - RNA, 5372*
  - POLYAMINES
    - CARBOXY-LYASES, 5357
  - PORPHYRIA
    - IMMUNOGLOBULINS, 5104
    - T-LYMPHOCYTES, 5104
  - PREDNISOLONE
    - ANTIBODIES, NEOPLASM, 5133*
    - CYTOTOXICITY TESTS, IMMUNOLOGIC, 5133*
  - PROTEIN KINASE
    - ISOLATION AND CHARACTERIZATION, 5355
  - PROTEINS
    - ARGININE, 5347
    - CANAVANINE, 5347
    - METABOLISM, 5347
  - RESPIRATION
    - CELL DIFFERENTIATION, 5334
  - RETRORSINE-N-OXIDE
    - CARCINOGENIC ACTIVITY, RAT, 4810
    - ISOLATION AND CHARACTERIZATION, 4810
  - STEARIC ACID
    - FATTY ACIDS, 5342
    - LIPIDS, 5342
  - STERIGMATOCYSTIN
    - CARCINOGENIC ACTIVITY, RAT, 4802
  - TANNIC ACID
    - CARCINOGENIC ACTIVITY, RAT, MOUSE, 4809
    - ISOLATION AND CHARACTERIZATION, 4809
  - TRANSPLANTATION, HOMOLOGOUS
    - CELL DIFFERENTIATION, 4898
  - VIRUS, AVIAN LEUKOSIS
    - ENZYMATIC ACTIVITY, 4987
    - NUCLEIC ACIDS, 4987
  - VIRUS, KIRSTEN MURINE SARCOMA
    - VIRUS REPLICATION, 5056*

- HEXOKINASE
  - CARBOHYDRATES
    - CELL TRANSFORMATION, NEOPLASTIC, 5343
    - FIBROBLASTS, 5343

- HEXOSES
  - LYMPHOSARCOMA
    - CELL MEMBRANE, 5261*
  - SARCOMA, RETICULUM CELL
    - CELL MEMBRANE, 5261*

- HISTIOCYTES
  - GALLBLADDER NEOPLASMS
    - GRANULOMA, 5206

- HISTOCOMPATIBILITY ANTIGENS
  - ADENOCARCINOMA
    - CELL MEMBRANE, 5264*
  - ANTIGENS, NEOPLASM
    - CELL MEMBRANE, 5129*
  - HODGKIN'S DISEASE
    - CASE REPORT, 5263*
    - GENETICS, 5263*
  - L CELLS
    - HYBRID CELLS, 5093
  - LEUKEMIA
    - HYBRID CELLS, 5094
    - IMMUNE SERUMS, 5094
    - T-LYMPHOCYTES, 5094
  - LYMPHOMA
    - HYBRID CELLS, 5093
  - MACROPHAGES
    - ISOLATION AND CHARACTERIZATION, 4870*
  - SARCOMA, MAST CELL
    - PAPAIN, 5092
    - TRYPSIN, 5092
  - THYROID NEOPLASMS
    - CHROMOSOMES, HUMAN, 6-12, 5232*
    - ISOANTIGENS, 5232*
  - VIRUS, FRIEND MURINE LEUKEMIA
    - IMMUNOFERRITIN ASSAY, 5130*
  - VIRUS, MURINE SARCOMA
    - ANTIGENIC DETERMINANTS, REVIEW, 4869*
  - VIRUS, SV40
    - CELL TRANSFORMATION, NEOPLASTIC, 5072*
    - IMMUNITY, CELLULAR, 5072*
    - VIRUS REPLICATION, 5072*

- HISTONES
  - HEPATOMA
    - CHROMATIN, 5346

- HODGKIN'S DISEASE
  - CHROMOSOME ABERRATIONS
    - REVIEW, 4873*
  - GENETICS
    - CASE REPORT, 5263*

- HISTOCOMPATIBILITY ANTIGENS, 5263*
- GEOGRAPHY
  - EPIDEMIOLOGY, REVIEW, 4837
- HISTOCOMPATIBILITY ANTIGENS
  - CASE REPORT, 5263*
- HISTOLOGICAL STUDY
  - EPIDEMIOLOGY, ITALY, 5290
- HISTOLOGY
  - DIAGNOSIS AND PROGNOSIS, REVIEW, 4875*
  - EPIDEMIOLOGY, REVIEW, 4875*
- HORIZONTAL TRANSMISSION
  - EPIDEMIOLOGY, 5300*
- HYDANTOIN, 5,5-DIPHENYL-
  - CASE REPORT, 4913
  - EPILEPSY, 4913
- IMMUNOGLOBULINS
  - MURAMIDASE, 5151
- IMMUNOLOGIC DEFICIENCY SYNDROMES
  - REVIEW, 4833
- LYMPHATIC NEOPLASMS
  - CASE REPORT, 5149
  - EPIDEMIOLOGY, HAMSTER, 5277
- LYMPHOCYTE TRANSFORMATION
  - PHASEOLUS VULGARIS, 5299*
- B-LYMPHOCYTES
  - IMMUNOGLOBULINS, 5151
- MITOGENS
  - EPIDEMIOLOGY, 5299*, 5300*
- NEOPLASMS, MULTIPLE PRIMARY
  - EPIDEMIOLOGY, ITALY, 5290
  - HISTOLOGICAL STUDY, 5290
- PLANT AGGLUTININS
  - EPIDEMIOLOGY, 5300*
  - LYMPHOCYTE TRANSFORMATION, 5299*
- REVERSE TRANSCRIPTASE
  - DIAGNOSIS AND PROGNOSIS, 5352
- RNA POLYMERASE
  - DIAGNOSIS AND PROGNOSIS, 5352

- HORMONES
  - BREAST NEOPLASMS
    - EPIDEMIOLOGY, REVIEW, 4851
    - REVIEW, 4852

- HYALURONIC ACID
  - BREAST NEOPLASMS
    - ADENOFIBROMA, 5344
    - CARCINOMA, SCIRRHOUS, 5344

- HYBRID CELLS
  - CHORIOCARCINOMA
    - ENZYMATIC ACTIVITY, MOUSE, 5364*
    - GENETICS, 5364*
    - NUCLEOSIDE DEAMINASES, 5364*
  - L CELLS
    - HISTOCOMPATIBILITY ANTIGENS, 5093
    - ISOANTIGENS, 5093
  - LEUKEMIA
    - ANTIGENIC DETERMINANTS, 5094
    - ANTIGENS, NEOPLASM, 5094
    - HISTOCOMPATIBILITY ANTIGENS, 5094
  - LYMPHOMA
    - HISTOCOMPATIBILITY ANTIGENS, 5093
    - ISOANTIGENS, 5093
  - MACROPHAGES
    - CELL FUSION, 5071*
  - MULTIPLE MYELOMA
    - CONTACT INHIBITION, 5112
    - IGE, 5112
    - IMMUNOGLOBULINS, HEAVY CHAIN, 5112
    - IMMUNOGLOBULINS, LIGHT CHAIN, 5112
  - PLASMACYTOMA
    - IMMUNOGLOBULINS, LIGHT CHAIN, 5099
  - VIRUS, B-TROPIC MURINE LEUKEMIA
    - VIRUS REPLICATION, 5000
  - VIRUS, MURINE LEUKEMIA
    - VIRAL PROTEINS, 5071*
    - VIRUS REPLICATION, 5049*
  - VIRUS, N-TROPIC MURINE LEUKEMIA
    - VIRUS REPLICATION, 5000
  - VIRUS, SV40
    - CHROMOSOMES, HUMAN, 6-12, 5071*
    - VIRAL PROTEINS, 5071*

- HYCANTHONE
  - MUTAGENIC ACTIVITY, YEAST
    - SCREENING METHOD, 4880

- HYDANTOIN, 5,5-DIPHENYL-
  - HODGKIN'S DISEASE
    - CASE REPORT, 4913
    - EPILEPSY, 4913
  - LYMPHOSARCOMA
    - CASE REPORT, 4913

- HYDRAZINE, 1,1-DIMETHYL-
  - CHOLANTHRENE, 3-METHYL-
    - DEALKYLATION, RAT, 4899

- HYDRAZINE, 1,2-DIMETHYL-
  - COLONIC NEOPLASMS
    - ADENOCARCINOMA, 4914
    - CARCINOGENIC ACTIVITY, RAT, 4914
    - DIET, 4914
  - METHANE, AZO-
    - CARCINOGENIC METABOLITE, 4940*
  - MICROSOMES, LIVER
    - ALKYLATION, 5247*
  - OXIDATION
    - CARCINOGENIC METABOLITE, 4940*

- HYDRAZINE, 1,2-DIMETHYL-, DIHYDROCHLORIDE
  - INTESTINAL NEOPLASMS
    - ADENOCARCINOMA, 4915
    - ADENOMA, 4915
    - CARCINOGENIC ACTIVITY, MOUSE, 4915
    - ULTRASTRUCTURAL STUDY, 4915
  - RECTAL NEOPLASMS
    - ADENOCARCINOMA, 4915
    - ADENOMA, 4915
    - CARCINOGENIC ACTIVITY, MOUSE, 4915
    - ULTRASTRUCTURAL STUDY, 4915

- HYDROCHLORIC ACID
  - MELANOMA
    - FLUORESCENCE, 5156
  - MELANOSIS
    - FLUORESCENCE, 5156
  - NEVUS, PIGMENTED
    - FLUORESCENCE, 5156

- HYDROGEN PEROXIDE
  - VIRUS, HERPES SIMPLEX 1
    - VIRUS REPLICATION, 5018
  - VIRUS, HERPES SIMPLEX 2
    - VIRUS REPLICATION, 5018

- HYDROXYACETYLAMINOFLUORENE
  - SEE ACETOHYDROXAMIC ACID, N-FLUOREN-2-YL-
- HYDROXYLASES
  - BENZO(A)PYRENE
    - MICROSOMES, LIVER, 4909
  - CYTOCHROME P-450
    - MUTATION, 4859*
- HYPERBARIC OXYGENATION
  - GUANIDINE, 1-METHYL-3-NITRO-1-NITROSO-
    - MUTAGENIC ACTIVITY, 4882
  - METHANESULFONIC ACID
    - MUTAGENIC ACTIVITY, 4882
  - PURINE, 2-AMINO-
    - MUTAGENIC ACTIVITY, 4882
  - SALMONELLA TYPHIMURIUM
    - GUANIDINE, 1-METHYL-3-NITRO-1-NITROSO-, 4882
    - METHANESULFONIC ACID, 4882
    - PURINE, 2-AMINO-, 4882
    - SULFURIC ACID, DIETHYL ESTER, 4882
    - URIDINE, 5-BROMO-2'-DEOXY-, 4882
  - SULFURIC ACID, DIETHYL ESTER
    - MUTAGENIC ACTIVITY, 4882
  - URIDINE, 5-BROMO-2'-DEOXY-
    - MUTAGENIC ACTIVITY, 4882
- IYPERPARATHYROIDISM
  - PARATHYROID NEOPLASMS
    - RADIATION, IONIZING, 4983*
  - RADIATION, IONIZING
    - EPIDEMIOLOGY, 4983*
  - THYROID NEOPLASMS
    - RADIATION, IONIZING, 4983*
- IYPERPLASIA
  - GYNECOLOGIC NEOPLASMS
    - ULTRASTRUCTURAL STUDY, REVIEW, 4850
- IYPERSENSITIVITY, DELAYED
  - LEUKEMIA
    - RADIATION, IONIZING, 4975*
    - STRONTIUM RADIOISOTOPES, 4975*
  - LEUKEMIA, LYMPHOBLASTIC
    - ANTIGENS, NEOPLASM, 5128*
    - GENETICS, 5128*
- IYPERTENSION
  - BREAST NEOPLASMS
    - EPIDEMIOLOGY, 5274
    - RESERPINE, 5274
- YPERTRICHOSIS
  - SKIN NEOPLASMS
    - RADIATION, IONIZING, 4968
- GE
  - MULTIPLE MYELOMA
    - HYBRID CELLS, 5112
- GG
  - LEUKEMIA, HAIRY CELL
    - ANTIGENIC DETERMINANTS, 5137*
    - BINDING, 5137*
    - IMMUNOGLOBULINS, SURFACE, 5137*
  - MYELOMA PROTEINS
    - BINDING, MACROPHAGES, 5098
- IGM
  - IMMUNOLOGIC DEFICIENCY SYNDROMES
    - CASE REPORT, 5150
  - LEUKEMIA, LYMPHOCYTIC
    - B-LYMPHOCYTES, 5101
- IMMUNE SERUMS
  - ASTROCYTOMA
    - ANTIBODY SPECIFICITY, 5131*
  - BREAST NEOPLASMS
    - T-LYMPHOCYTES, 5139*
    - ROSETTE FORMATION, 5139*
  - COMPLEMENT
    - BINDING, SERA, MALIGNANT, 5142*
  - HEPATOMA
    - FETAL GLOBULINS, 5103
  - KIDNEY NEOPLASMS
    - IMMUNITY, CELLULAR, 5141*
  - L CELLS
    - NEOPLASM TRANSPLANTATION, 5143*
  - LEUKEMIA
    - ANTIGENIC DETERMINANTS, 5094
    - ANTIGENS, NEOPLASM, 5094
    - HISTOCOMPATIBILITY ANTIGENS, 5094
  - LEUKEMIA, MYELOBLASTIC
    - IMMUNOGLOBULINS, SURFACE, 5145*
  - LEUKEMIA, MYELOCYTIC
    - ANTIBODY SPECIFICITY, 5140*
  - T-LYMPHOCYTES
    - BRAIN, 5106
  - LYMPHOMA
    - VIRUS, HERPES SAIMIRI, 5016
  - NEURILEMMOMA
    - ANTIBODY SPECIFICITY, 5131*
  - PROSTATIC NEOPLASMS
    - IMMUNITY, CELLULAR, 5141*
  - SARCOMA, MAST CELL
    - PAPAIN, 5092
    - TRYPSIN, 5092
  - SARCOMA, OSTEOGENIC
    - VIRUS, MOLONEY MURINE SARCOMA, 5114*
  - VIRUS, EPSTEIN-BARR
    - ANTIGEN-ANTIBODY REACTIONS, 5025
    - VIRUS REPLICATION, MARMOSET, 5025
  - VIRUS, HERPES SAIMIRI
    - LYMPHOCYTES, 5016
    - PLANT AGGLUTININS, 5016
- IMMUNITY, ACTIVE
  - SARCOMA, YOSHIDA
    - BONE MARROW CELLS, 5120*
    - TRANSPLANTATION IMMUNOLOGY, 5120*
- IMMUNITY, CELLULAR
  - CARCINOMA 256, WALKER
    - GUANIDINE, 1-ETHYL-3-NITRO-1-NITROSO-, 4916
  - COLONIC NEOPLASMS
    - CARCINOEMBRYONIC ANTIGEN, 4834
    - LYMPHOCYTES, 5125*
    - T-LYMPHOCYTES, 5125*
  - GLIOMA
    - LYMPHOCYTES, 5113*
    - UREA, METHYL NITROSO-, 5113*
  - INFECTIOUS MONONUCLEOSIS
    - LEUKOCYTES, 5121*

        VIRUS, EPSTEIN-BARR, 5121*
    KIDNEY NEOPLASMS
        IMMUNE SERUMS, 5141*
        LEUKOCYTE ADHERENCE INHIBITION, 5141*
    LEUKEMIA, LYMPHOCYTIC
        LYMPHOCYTES, 5124*
        MELANOMA, 5124*
        UROGENITAL NEOPLASMS, 5124*
    MELANOMA
        LYMPHOCYTES, 5125*
    PROSTATIC NEOPLASMS
        IMMUNE SERUMS, 5141*
        LEUKOCYTE ADHERENCE INHIBITION, 5141*
    SARCOMA
        BURSA OF FABRICIUS, 5119*
        CHOLANTHRENE, 3-METHYL-, 5122*
        CYTOTOXICITY TESTS, IMMUNOLOGIC, 5123*
        B-LYMPHOCYTES, 5122*
        T-LYMPHOCYTES, 5122*
        VIRUS, RETICULOENDOTHELIOSIS, 5119*
    SARCOMA, OSTEOGENIC
        TRANSFER FACTOR, 5223*
    SARCOMA, YOSHIDA
        T-LYMPHOCYTES, 5120*
    VIRUS, MURINE SARCOMA
        ANTIGENIC DETERMINANTS, REVIEW, 4869*
    VIRUS, SV40
        HISTOCOMPATIBILITY ANTIGENS, 5072*

IMMUNITY, PASSIVE
    VIRUS, GARDNER ARNSTEIN FELINE SARCOMA
        VIRAL VACCINES, 5002
    VIRUS, RICKARD FELINE LEUKEMIA
        VIRAL VACCINES, 5002
    VIRUS, SYNDER-THEILEN FELINE SARCOMA
        VIRAL VACCINES, 5002

IMMUNIZATION
    VIRUS, HERPES SIMPLEX 2
        NEOPLASM METASTASIS, 5117*

IMMUNOGENETICS
    HISTOCOMPATIBILITY ANTIGENS
        REVIEW, 4870*

IMMUNOGLOBULIN FRAGMENTS
    MYELOMA PROTEINS
        DNA, 5100
        DNA-RNA HYBRIDIZATION, 5100
        GENETICS, 5100
        RNA, MESSENGER, 5100

IMMUNOGLOBULINS
    SEE ALSO IGA/IGD/IGE/IGM
    HEPATOMA
        PORPHYRIA, 5104
    HODGKIN'S DISEASE
        B-LYMPHOCYTES, 5151
        MURAMIDASE, 5151
    LEUKEMIA
        UREA, METHYL NITROSO-, 4894
    LYMPHOMA, GIANT FOLLICULAR
        B-LYMPHOCYTES, 5151
        MURAMIDASE, 5151
    MULTIPLE MYELOMA
        DNA, VIRAL, 5144*
        RNA, MESSENGER, 5144*
    PORPHYRIA
        B-LYMPHOCYTES, 5104
        T-LYMPHOCYTES, 5104
    SARCOMA, RETICULUM CELL
        B-LYMPHOCYTES, 5151
        MURAMIDASE, 5151

IMMUNOGLOBULINS, FAB
    LEUKEMIA, HAIRY CELL
        IMMUNOGLOBULINS, SURFACE, 5137*

IMMUNOGLOBULINS, FC
    CHOLERA
        MITOCHONDRIA, 4949*
    MYELOMA PROTEINS
        BINDING, MACROPHAGES, 5098

IMMUNOGLOBULINS, HEAVY CHAIN
    MULTIPLE MYELOMA
        HYBRID CELLS, 5112

IMMUNOGLOBULINS, LIGHT CHAIN
    MULTIPLE MYELOMA
        HYBRID CELLS, 5112
    PLASMACYTOMA
        AZAGUANINE RESISTANCE, 5099
        HYBRID CELLS, 5099
        RNA, MESSENGER, 5099

IMMUNOGLOBULINS, SURFACE
    CHOLERA
        MITOCHONDRIA, 4949*
    LEUCOSARCOMA
        B-LYMPHOCYTES, 5101
    LEUKEMIA
        VIRUS, FRIEND MURINE LEUKEMIA, 4999
        VIRUS, GRAFFI MURINE LEUKEMIA, 4999
        VIRUS, MURINE LEUKEMIA, 4999
        VIRUS, RAUSCHER MURINE LEUKEMIA, 4999
    LEUKEMIA, HAIRY CELL
        IGG, 5137*
        IMMUNOGLOBULINS, FAB, 5137*
        LYMPHOCYTES, 5255*
    LEUKEMIA, LYMPHOBLASTIC
        B-LYMPHOCYTES, 5101
    LEUKEMIA, LYMPHOCYTIC
        B-LYMPHOCYTES, 5101
    LEUKEMIA, MYELOBLASTIC
        GAMMA GLOBULINS, 5145*
        IMMUNE SERUMS, 5145*
        LEUKOCYTES, 5145*
        ROSETTE FORMATION, 5145*
    LYMPHOSARCOMA
        LYMPHOCYTES, 5102
    VIRUS, ADENO 2
        CELL TRANSFORMATION, NEOPLASTIC, 5079*

IMMUNOLOGIC DEFICIENCY SYNDROMES
    COMPLEMENT
        ESTERASES, 5150
    HODGKIN'S DISEASE
        REVIEW, 4833

  - IGM
    - CASE REPORT, 5150
  - LYMPHATIC DISEASES
    - CASE REPORT, 5150
  - LYMPHOSARCOMA
    - REVIEW, 4833
  - SARCOMA, RETICULUM CELL
    - REVIEW, 4833
  - VIRUS, POLYOMA, BK
    - ISOLATION AND CHARACTERIZATION, REVIEW, 4827

- IMMUNOSUPPRESSION
  - BACTERIAL INFECTIONS
    - REVIEW, 4835
  - ERYTHREMIC MYELOSIS
    - CASE REPORT, 5237*
    - PREGNA-1,4-DIENE-3,11,20-TRIONE, 17,21-DIHYDROXY-, 5237*
    - PURINE, 6-((1-METHYL-4-NITROIMIDAZOL-5-YL)THIO)-, 5237*
  - HEPATOMA
    - FETAL GLOBULINS, 5103
  - INFECTIOUS MONONUCLEOSIS
    - VIRUS, EPSTEIN-BARR, 5121*
  - NEOPLASMS
    - REVIEW, 4835
  - PARASITES
    - REVIEW, 4835
  - SARCOMA, YOSHIDA
    - TRANSPLANTATION IMMUNOLOGY, 5120*
  - SCHISTOSOMIASIS
    - INFLAMMATION, 4835
  - VIRUS, FRIEND MURINE LEUKEMIA
    - B-LYMPHOCYTES, 5108
    - T-LYMPHOCYTES, 5108
    - MACROPHAGES, 5108
  - VIRUS, POLYOMA, BK
    - ISOLATION AND CHARACTERIZATION, REVIEW, 4827
  - VIRUS, ROWSON-PARR MURINE LEUKEMIA
    - B-LYMPHOCYTES, 5108
    - T-LYMPHOCYTES, 5108
    - MACROPHAGES, 5108

- IMMUNOSUPPRESSIVE AGENTS
  - LEUKEMIA, MYELOCYTIC
    - INTERFERON, 5109

- INFECTIOUS MONONUCLEOSIS
  - LEUKOCYTES
    - IMMUNITY, CELLULAR, 5121*
  - B-LYMPHOCYTES
    - IMMUNE RESPONSE, 5121*
  - T-LYMPHOCYTES
    - IMMUNE RESPONSE, 5121*
  - VIRUS, EPSTEIN-BARR
    - IMMUNITY, CELLULAR, 5121*
    - IMMUNOSUPPRESSION, 5121*
    - LEUKOCYTE TRANSFORMATION, 5028

- INSECTICIDES, ORGANOPHOSPHATE
  - DROSOPHILA
    - MUTAGENIC ACTIVITY, REVIEW, 4801
  - ESCHERICHIA COLI
    - MUTAGENIC ACTIVITY, REVIEW, 4801
  - HELA CELLS
    - MUTAGENIC ACTIVITY, REVIEW, 4801

- INSECTS
  - AFLATOXIN B1
    - FOOD CONTAMINATION, 4948*

- INSULIN
  - HEPATOMA
    - ANTIBODIES, NEOPLASM, 5133*
    - ARYL HYDROCARBON HYDROXYLASES, 4987
    - CYTOTOXICITY TESTS, IMMUNOLOGIC, 5133*
    - GLUCOSEPHOSPHATASE, 4987
    - GLUCOSEPHOSPHATE DEHYDROGENASE, 4987
    - PROTEINS, 5347
  - MAMMARY NEOPLASMS, EXPERIMENTAL
    - DNA, NEOPLASM, 5379*
    - TISSUE CULTURE, 5379*

- INTERFERON
  - LEUKEMIA, LYMPHOBLASTIC
    - LEUKOCYTES, 5109
  - LEUKEMIA, LYMPHOCYTIC
    - LEUKOCYTES, 5109
  - LEUKEMIA, MYELOBLASTIC
    - LEUKOCYTES, 5109
  - LEUKEMIA, MYELOCYTIC
    - ACTINOMYCIN C, 5109
    - CYCLOHEXIMIDE, 5109
    - IMMUNOSUPPRESSIVE AGENTS, 5109
    - LEUKOCYTES, 5109
    - PUROMYCIN, 5109
    - VIRUS, SENDAI, 5109

- INTESTINAL NEOPLASMS
  - ADENOCARCINOMA
    - CASE REPORT, 5196
    - EPIDEMIOLOGY, CAT, 5323*
    - GENETICS, 5199
    - HISTOLOGICAL STUDY, CAT, 5323*
    - HYDRAZINE, 1,2-DIMETHYL-, DIHYDROCHLORIDE, 4915
    - INTESTINAL POLYPS, 5199
    - PRECANCEROUS CONDITIONS, 5199
  - ADENOCARCINOMA, PAPILLARY
    - EPIDEMIOLOGY, CAT, 5323*
  - ADENOMA
    - EPIDEMIOLOGY, 5198
    - HYDRAZINE, 1,2-DIMETHYL-, DIHYDROCHLORIDE, 4915
  - AGE FACTORS
    - EPIDEMIOLOGY, 5310*
  - CARCINOMA, MUCINOUS
    - EPIDEMIOLOGY, CAT, 5323*
  - DIETARY FATS
    - EPIDEMIOLOGY, REVIEW, 4843
  - EPIDEMIOLOGY
    - SCOTLAND, 5310*
  - ETHNIC GROUPS
    - EPIDEMIOLOGY, REVIEW, 4842
  - GUANIDINE, 1-METHYL-3-NITRO-1-NITROSO-
    - CARCINOGENIC ACTIVITY, DOG, 4920
    - CARCINOGENIC ACTIVITY, RAT, 4921
  - HYDRAZINE, 1,2-DIMETHYL-, DIHYDROCHLORIDE
    - CARCINOGENIC ACTIVITY, MOUSE, 4915
    - ULTRASTRUCTURAL STUDY, 4915

    - EPIDEMIOLOGY, REVIEW, 4842

  - LEIOMYOSARCOMA
    - GUANIDINE, 1-METHYL-3-NITRO-1-NITROSO-, 4920, 4921
  - POLYPS
    - EPIDEMIOLOGY, 5198
  - PRECANCEROUS CONDITIONS
    - CASE REPORT, 5196
  - SEX FACTORS
    - EPIDEMIOLOGY, 5310*
  - SOCIOECONOMIC FACTORS
    - EPIDEMIOLOGY, REVIEW, 4842

- INTESTINAL POLYPS
  - COLONIC NEOPLASMS
    - ADENOCARCINOMA, 5199
  - INTESTINAL NEOPLASMS
    - ADENOCARCINOMA, 5199
  - STOMACH NEOPLASMS
    - GENETICS, 5200
    - PRECANCEROUS CONDITIONS, 5200

- IODINE RADIOISOTOPES
  - LEUKEMIA
    - EPIDEMIOLOGY, 5326*
  - THYROID NEOPLASMS
    - EPIDEMIOLOGY, 5326*
    - THYROTROPIN, 4982*
    - URACIL, 6-PROPYL-2-THIO-, 4982*

- IRON
  - NEOPLASMS, MUSCLE TISSUE
    - SARCOMA, 4925, 4926

- IRON DISULFIDE
  - SARCOMA
    - STRUCTURE-ACTIVITY RELATIONSHIP, 4927

- ISLET CELL TUMOR
  - ENDOCRINE GLAND NEOPLASMS
    - EPIDEMIOLOGY, HAMSTER, 5276

- ISOANTIBODIES
  - MACROPHAGES
    - ISOLATION AND CHARACTERIZATION, 4870*

- ISOANTIGENS
  - BREAST NEOPLASMS
    - EPIDEMIOLOGY, REVIEW, 4851
  - L CELLS
    - HYBRID CELLS, 5093
  - LEUKEMIA, MYELOBLASTIC
    - B-LYMPHOCYTES, 5126*
  - B-LYMPHOCYTES
    - ISOLATION AND CHARACTERIZATION, 4870*
  - LYMPHOMA
    - HYBRID CELLS, 5093
  - MACROPHAGES
    - ISOLATION AND CHARACTERIZATION, 4870*
  - THYMOMA
    - IMMUNE SERUMS, 5115*
  - THYROID NEOPLASMS
    - HISTOCOMPATIBILITY ANTIGENS, 5232*

- ISOENZYMES
  - DIPHENOL OXIDASES
    - MOUSE, COAT COLOR MUTANT, 5398*
  - DUODENAL ULCER
    - LACTATE DEHYDROGENASE, 5229*
  - PEPTIC ULCER
    - LACTATE DEHYDROGENASE, 5229*
  - STOMACH NEOPLASMS
    - LACTATE DEHYDROGENASE, 5229*

- ISOPROTERENOL
  - MELANOMA
    - ADENOSINE CYCLIC 3',5' MONOPHOSPHATE, 5388*
  - NEURILEMMOMA
    - SURFACE PROPERTIES, 5386*

- JACOBINE
  - ISOLATION AND CHARACTERIZATION
    - MUTAGENIC ACTIVITY, 4806
    - TOXICITY, MOUSE, 4806

- KARYOTYPING
  - CHROMOSOME ABERRATIONS
    - NEOPLASM TRANSPLANTATION, 5369*
  - DISGERMINOMA
    - TURNER'S SYNDROME, 5178
  - L CELLS
    - URIDINE, 5-BROMO-2'-DEOXY-, 5365*
  - MUTATION
    - NEOPLASM TRANSPLANTATION, 5369*
  - OVARIAN NEOPLASMS
    - CARCINOMA, 5170
  - PLANT TUMORS
    - CELL NUCLEUS, 4950*
  - SARCOMA
    - URIDINE, 5-BROMO-2'-DEOXY-, 5365*
  - UROGENITAL NEOPLASMS
    - CARCINOMA, 5170
    - CARCINOSARCOMA, 5170
    - GRANULOSA CELL TUMOR, 5170
    - TERATOID TUMOR, 5170

- KIDNEY
  - RADIATION, IONIZING
    - TRANSPLANTATION, HOMOLOGOUS, 4984*

- KIDNEY NEOPLASMS
  - ADENOCARCINOMA
    - BLOCKING FACTOR, 5141*
    - EPIDEMIOLOGY, GERMANY, 5207
    - UREA, ETHYL NITROSO-, 4893
  - CARCINOMA
    - EPIDEMIOLOGY, GERMANY, 5207
  - EPIDEMIOLOGY
    - ALASKA, NATIVES, 5294*
  - IMMUNE SERUMS
    - IMMUNITY, CELLULAR, 5141*
  - IMMUNITY, CELLULAR
    - LEUKOCYTE ADHERENCE INHIBITION, 5141*
  - NEOPLASM METASTASIS
    - EPIDEMIOLOGY, GERMANY, 5207
  - NEOPLASMS, EMBRYONAL AND MIXED
    - CASE REPORT, 5208
    - NEOPLASM METASTASIS, 5208
  - NEPHROBLASTOMA
    - UREA, ETHYL NITROSO-, 4893
  - SARCOMA
    - EPIDEMIOLOGY, GERMANY, 5207
    - UREA, ETHYL NITROSO-, 4893

- TRANSPLANTATION, HOMOLOGOUS
  - CELL DIFFERENTIATION, 4898
- UREA, ETHYL NITROSO-
  - TRANSPLACENTAL CARCINOGENESIS, RABBIT, 4893

L CELLS
- ADENOSINE TRIPHOSPHATASE
  - GLYCOPROTEINS, 5399*
- ANTI-ANTIBODIES
  - DOSE-RESPONSE STUDY, 5136*
  - GROWTH, 5136*
  - PHOSPHATE, 5132*
  - PHOSPHOLIPIDS, 5132*
- ANTIBODIES, NEOPLASM
  - COMPLEMENT, 5135*
- CALCIUM
  - ANTIBODIES, NEOPLASM, 5135*
  - COMPLEMENT, 5135*
  - GLYCOPROTEINS, 5399*
- COMPLEMENT
  - GROWTH, 5136*
  - NEOPLASM TRANSPLANTATION, 5143*
- GLYCOPROTEINS
  - MICROTUBULES, 5399*
- HYBRID CELLS
  - HISTOCOMPATIBILITY ANTIGENS, 5093
  - ISOANTIGENS, 5093
- IMMUNE SERUMS
  - NEOPLASM TRANSPLANTATION, 5143*
- PHOSPHATE
  - METABOLISM, 5132*
- URIDINE, 5-BROMO-2'-DEOXY-
  - C-BINDING, 5365*
  - DNA, NEOPLASM, 5365*
  - KARYOTYPING, 5365*
- VIRUS, MENGO
  - VIRAL PROTEINS, 5030

LACTATE DEHYDROGENASE
- COLONIC NEOPLASMS
  - PRECANCEROUS CONDITIONS, 5234*
- DUODENAL ULCER
  - ISOENZYMES, 5229*
- PEPTIC ULCER
  - ISOENZYMES, 5229*
- STOMACH NEOPLASMS
  - GASTRITIS, 5229*
  - ISOENZYMES, 5229*
  - METAPLASIA, 5229*
  - PRECANCEROUS CONDITIONS, 5229*

LACTIC ACID
- HEPATOMA
  - METABOLISM, RAT LIVER, 5371*

LARYNGEAL NEOPLASMS
- SOCIOECONOMIC FACTORS
  - DIAGNOSIS AND PROGNOSIS, 5295*

LASIOCARPINE
- ADENOMA
  - CARCINOGENIC ACTICITY, RAT, 4808
- CARCINOMA, EPIDERMOID
  - CARCINOGENIC ACTICITY, RAT, 4808
- HEPATOMA
  - CARCINOGENIC ACTICITY, RAT, 4808
  - ISOLATION AND CHARACTERIZATION, 4808

LEIOMYOMA
- GYNECOLOGIC NEOPLASMS
  - ASCORBIC ACID, 5345
  - MALATE DEHYDROGENASE, 5345
  - PYRUVIC ACID, 5345
- PERITONEAL NEOPLASMS
  - CASE REPORT, 5213*
  - HISTOLOGICAL STUDY, 5213*
  - PREGNANCY, 5213*

LEIOMYOSARCOMA
- GYNECOLOGIC NEOPLASMS
  - ULTRASTRUCTURAL STUDY, REVIEW, 4850
- INTESTINAL NEOPLASMS
  - GUANIDINE, 1-METHYL-3-NITRO-1-NITROSO-, 4920, 4921
- PERITONEAL NEOPLASMS
  - PREGNANCY, 5213*

LESCH-NYHAN SYNDROME
- VIRUS, SV40
  - CELL TRANSFORMATION, NEOPLASTIC, 5071*
  - CHROMOSOMES, HUMAN, 6-12, 5071*

LEUCINE
- ACETIC ACID, COPPER(2+) SALT
  - RNA, TRANSFER, 4924
- BUTYRIC ACID, 2-AMINO-4-(ETHYLTHIO)-
  - RNA, TRANSFER, 4924
- VIRUS, MURINE LEUKEMIA
  - CELL TRANSFORMATION, NEOPLASTIC, 5054*
  - METABOLISM, 5054*
- VIRUS, MURINE SARCOMA
  - CELL TRANSFORMATION, NEOPLASTIC, 5054*
  - METABOLISM, 5054*

LEUCOSARCOMA
- B-LYMPHOCYTES
  - IMMUNOGLOBULINS, SURFACE, 5101

LEUKEMIA
- ANEUPLOIDY
  - ULTRASTRUCTURAL STUDY, NUCLEAR BLEBS, 5257*
- ANIMAL DISEASES
  - TRANSMISSION, REVIEW, 4836
- ANTIGENS, NEOPLASM
  - HYPERSENSITIVITY, DELAYED, DOG, 5111
  - LYMPHOCYTE TRANSFORMATION, DOG, 5111
- ANTIGENS, VIRAL
  - ISOLATION AND CHARACTERIZATION, 5127*
- BONE MARROW CELLS
  - CELL DIFFERENTIATION, 5155
  - HISTOLOGICAL STUDY, 5155
  - ULTRASTRUCTURAL STUDY, NUCLEAR BLEBS, 5257*
- BURKITT'S LYMPHOMA
  - CASE REPORT, 5148
- CARCINOGEN, CHEMICAL
  - EPIDEMIOLOGY, REVIEW, 4877*
- CELL DIFFERENTIATION
  - REVIEW, 4845

- CHROMOSOME ABNORMALITIES
  - TRANSPLACENTAL CARCINOGENESIS, 4876*
- COMMUNICABLE DISEASES
  - EPIDEMIOLOGY, REVIEW, 4877*
- EPIDEMIOLOGY
  - INDIA, 5298*
  - UNITED STATES, 5320*
- GENETICS
  - EPIDEMIOLOGY, REVIEW, 4877*
- GEOGRAPHY
  - EPIDEMIOLOGY, REVIEW, 4837
- HEMATOPOIETIC STEM CELLS
  - CELL DIFFERENTIATION, 4845
- HORIZONTAL TRANSMISSION
  - CASE-CONTROL STUDY, 5301*
  - EPIDEMIOLOGY, REVIEW, 4877*
- HYBRID CELLS
  - ANTIGENIC DETERMINANTS, 5094
  - ANTIGENS, NEOPLASM, 5094
  - HISTOCOMPATIBILITY ANTIGENS, 5094
- IMMUNE SERUMS
  - ANTIGENIC DETERMINANTS, 5094
  - ANTIGENS, NEOPLASM, 5094
  - HISTOCOMPATIBILITY ANTIGENS, 5094
- IODINE RADIOISOTOPES
  - EPIDEMIOLOGY, 5326*
- LEUKOCYTES
  - HISTOLOGICAL STUDY, 5155
- LYMPHOCYTES
  - HISTOLOGICAL STUDY, 5155
- T-LYMPHOCYTES
  - ANTIGENIC DETERMINANTS, 5094
  - ANTIGENS, NEOPLASM, 5094
  - HISTOCOMPATIBILITY ANTIGENS, 5094
- RADIATION, IONIZING
  - CELL DIFFERENTIATION, 4975*
  - EPIDEMIOLOGY, REVIEW, 4877*
  - HYPERSENSITIVITY, DELAYED, 4975*
  - IMMUNE RESPONSE, 4975*
  - THYMECTOMY, 4975*
  - THYMOMA, 4975*
  - TRANSPLACENTAL CARCINOGENESIS, 4876*
- STRONTIUM RADIOISOTOPES
  - CELL DIFFERENTIATION, 4975*
  - HYPERSENSITIVITY, DELAYED, 4975*
  - IMMUNE RESPONSE, 4975*
  - THYMECTOMY, 4975*
  - THYMOMA, 4975*
- TONSILLECTOMY
  - EPIDEMIOLOGY, CHILD, 5147
- TRANSPLANTATION, HOMOLOGOUS
  - RADIATION EFFECTS, 4984*
- TWINS
  - EPIDEMIOLOGY, REVIEW, 4876*
- ULTRASTRUCTURAL STUDY
  - CLASSIFICATION, CHILDHOOD, 5262*
- UREA, METHYL NITROSO-
  - BONE MARROW CELLS, 4894
  - IMMUNOGLOBULINS, 4894
  - B-LYMPHOCYTES, 4894
- VIRUS, FRIEND MURINE LEUKEMIA
  - IMMUNE RESPONSE, MOUSE, 4999
  - IMMUNOGLOBULINS, SURFACE, 4999
  - T-LYMPHOCYTES, 4999
- VIRUS, GRAFFI MURINE LEUKEMIA
  - IMMUNE RESPONSE, MOUSE, 4999
  - IMMUNOGLOBULINS, SURFACE, 4999
  - T-LYMPHOCYTES, 4999
- VIRUS, MURINE LEUKEMIA
  - IMMUNE RESPONSE, MOUSE, 4999
  - IMMUNOGLOBULINS, SURFACE, 4999
  - T-LYMPHOCYTES, 4999
- VIRUS, RAUSCHER MURINE LEUKEMIA
  - IMMUNE RESPONSE, MOUSE, 4999
  - IMMUNOGLOBULINS, SURFACE, 4999
  - T-LYMPHOCYTES, 4999
- VIRUS, VERTEBRATE
  - EPIDEMIOLOGY, REVIEW, 4836
  - TRANSMISSION, REVIEW, 4836

LEUKEMIA, ACUTE LYMPHOCYTIC
- SEE LEUKEMIA, LYMPHOBLASTIC

LEUKEMIA, HAIRY CELL
- IGG
  - ANTIGENIC DETERMINANTS, 5137*
  - BINDING, 5137*
- IMMUNOGLOBULINS, SURFACE
  - IGG, 5137*
  - IMMUNOGLOBULINS, FAB, 5137*
- LYMPHOCYTES
  - ACID PHOSPHATASE, 5255*
  - IMMUNOGLOBULINS, SURFACE, 5255*
- B-LYMPHOCYTES
  - CELL DIFFERENTIATION, 5255*

LEUKEMIA L1210
- ACTINOMYCIN D
  - CELL MEMBRANE, 5370*
  - ULTRASTRUCTURAL STUDY, 5370*
- CARBOHYDRATES
  - BINDING SITES, 5097
  - CONCANAVALIN A, 5097
- CELL MEMBRANE
  - CARBOHYDRATES, 5097
  - ULTRASTRUCTURAL STUDY, 5097
- METHANESULFONIC ACID, THIO-, S-METHYL ESTER
  - CELL DIVISION, 5336
- PHOSPHODIESTERASES
  - KINETIC STUDY, 5389*
- SULFHYDRYL COMPOUNDS
  - CELL DIVISION, 5336

LEUKEMIA, LYMPHOBLASTIC
- ANTIGENS, NEOPLASM
  - HYPERSENSITIVITY, DELAYED, 5128*
  - IMMUNE SERUMS, 5140*
- CHILD
  - EPIDEMIOLOGY, 5297*
  - RACIAL FACTORS, 5297*
- CHROMOSOME ABERRATIONS
  - HORIZONTAL TRANSMISSION, 5146
  - VERTICAL TRANSMISSION, 5146
- CHROMOSOMES, HUMAN, 21-22
  - REVIEW, 4874*
- GENETICS
  - HYPERSENSITIVITY, DELAYED, 5128*
- LEUKEMIA, MYELOCYTIC
  - ANTIGEN-ANTIBODY REACTIONS, 5140*
- LEUKOCYTES
  - ELECTROPHORETIC MOBILITY, 5341
  - INTERFERON, 5109
- LYMPHOCYTES
  - MIGRATION INHIBITORY FACTOR, 5128*
- B-LYMPHOCYTES

    - GLUTAMYL TRANSPEPTIDASE, 5356
    - IMMUNOGLOBULINS, SURFACE, 5101
    - ROSETTE FORMATION, 5096
  - T-LYMPHOCYTES
    - BRAIN, 5106
    - GLUTAMYL TRANSPEPTIDASE, 5356
    - ROSETTE FORMATION, 5096
  - VIRUS, GIBBON APE LYMPHOMA
    - ANTIGENIC DETERMINANTS, 5138*

- LEUKEMIA, LYMPHOCYTIC
  - ADENOSINE CYCLIC 3',5' MONOPHOSPHATE
    - DIAGNOSIS AND PROGNOSIS, 5352
  - ELEMENTS
    - ULTRASTRUCTURAL STUDY, 5259*
  - LEUKOCYTES
    - INTERFERON, 5109
    - ZINC, 5259*
  - LYMPHOCYTES
    - IMMUNITY, CELLULAR, 5124*
    - MICROCYTOTOXICITY, 5124*
  - B-LYMPHOCYTES
    - GLUTAMYL TRANSPEPTIDASE, 5356
    - IGM, 5101
    - IMMUNOGLOBULINS, SURFACE, 5101
  - T-LYMPHOCYTES
    - BRAIN, 5106
    - GLUTAMYL TRANSPEPTIDASE, 5356
  - MELANOMA
    - IMMUNITY, CELLULAR, 5124*
  - PHOSPHODIESTERASES
    - KINETIC STUDY, 5389*
  - REVERSE TRANSCRIPTASE
    - DIAGNOSIS AND PROGNOSIS, 5352
  - RNA POLYMERASE
    - DIAGNOSIS AND PROGNOSIS, 5352
  - RNA, TRANSFER, METHYLTRANSFERASES
    - DIAGNOSIS AND PROGNOSIS, 5352
  - UROGENITAL NEOPLASMS
    - IMMUNITY, CELLULAR, 5124*
  - VIRUS, FELINE LEUKEMIA
    - EPIDEMIOLOGY, 5061*

- LEUKEMIA, MONOBLASTIC
  - ELEMENTS
    - ULTRASTRUCTURAL STUDY, 5259*
  - LEUKOCYTES
    - ZINC, 5259*

- LEUKEMIA, MYELOBLASTIC
  - ADENOSINE CYCLIC 3',5' MONOPHOSPHATE
    - DIAGNOSIS AND PROGNOSIS, 5352
  - AMINO ACYL T RNA SYNTHETASES
    - DIAGNOSIS AND PROGNOSIS, 5352
  - ANTIGENS, NEOPLASM
    - IMMUNE SERUMS, 5140*
  - CHILD
    - EPIDEMIOLOGY, 5297*
    - RACIAL FACTORS, 5297*
  - DNA POLYMERASE
    - DIAGNOSIS AND PROGNOSIS, 5352
  - GAMMA GLOBULINS
    - IMMUNOGLOBULINS, SURFACE, 5145*
  - IMMUNE SERUMS
    - IMMUNOGLOBULINS, SURFACE, 5145*
  - IMMUNOGLOBULINS, SURFACE
    - ROSETTE FORMATION, 5145*
  - LEUKEMIA, MYELOCYTIC
    - ANTIGEN-ANTIBODY REACTIONS, 5140*
  - LEUKOCYTES
    - IMMUNOGLOBULINS, SURFACE, 5145*
    - INTERFERON, 5109
  - B-LYMPHOCYTES
    - ISOANTIGENS, 5126*
  - REVERSE TRANSCRIPTASE
    - DIAGNOSIS AND PROGNOSIS, 5352
  - RNA POLYMERASE
    - DIAGNOSIS AND PROGNOSIS, 5352
  - RNA, TRANSFER, METHYLTRANSFERASES
    - DIAGNOSIS AND PROGNOSIS, 5352*
  - VIRUS, C-TYPE BABOON
    - DNA-RNA HYBRIDIZATION, 5010
    - RNA, VIRAL, 5010
  - VIRUS, GIBBON APE LYMPHOMA
    - ANTIGENIC DETERMINANTS, 5138*

- LEUKEMIA, MYELOCYTIC
  - ACTINOMYCIN C
    - INTERFERON, 5109
  - BLOOD PLATELETS
    - PRECANCEROUS CONDITIONS, 5253*
    - ULTRASTRUCTURAL STUDY, 5253*
  - CELL DIFFERENTIATION
    - HEMATOPOIETIC STEM CELLS, 5291
  - CELL MEMBRANE
    - PYROANTIMONATE BINDING, 5256*
  - CHROMOSOME ABERRATIONS
    - REVIEW, 4873*
  - COLCHICINE
    - CASE REPORT, 4923
    - GOUT, 4923
  - CYCLOHEXIMIDE
    - INTERFERON, 5109
  - EPIDEMIOLOGY
    - INDIA, 5298*
  - HEMATOPOIETIC STEM CELLS
    - CELL DIFFERENTIATION, 5254*
  - IMMUNE SERUMS
    - ANTIBODY SPECIFICITY, 5140*
  - IMMUNOSUPPRESSIVE AGENTS
    - INTERFERON, 5109
  - LEUKEMIA, LYMPHOBLASTIC
    - ANTIGEN-ANTIBODY REACTIONS, 5140*
  - LEUKEMIA, MYELOBLASTIC
    - ANTIGEN-ANTIBODY REACTIONS, 5140*
  - LEUKOCYTES
    - INTERFERON, 5109
  - MONOCYTES
    - STATISTICAL ANALYSIS, 5340
    - ULTRASTRUCTURAL STUDY, ACID MUCOSUBSTANCE, 5258*
  - NEUTROPHILS
    - PYROANTIMONATE BINDING, 5256*
    - STATISTICAL ANALYSIS, 5340
    - ULTRASTRUCTURAL STUDY, 5256*
    - ULTRASTRUCTURAL STUDY, ACID MUCOSUBSTANCE, 5258*
  - PLATELET AGGREGATION
    - PRECANCEROUS CONDITIONS, 5253*
    - ULTRASTRUCTURAL STUDY, 5253*
  - POLYCYTHEMIA VERA
    - STATISTICAL ANALYSIS, 5340
  - PUROMYCIN
    - INTERFERON, 5109
  - RADIATION, IONIZING
    - P-CRESOL, 2,6-DI-TERT-BUTYL-, 4954*
  - REVERSE TRANSCRIPTASE

        - DIAGNOSIS AND PROGNOSIS, 5352
    - RNA POLYMERASE
        - DIAGNOSIS AND PROGNOSIS, 5352
    - RNA, TRANSFER, METHYLTRANSFERASES
        - DIAGNOSIS AND PROGNOSIS, 5352
    - SULFINPYRAZONE
        - CASE REPORT, 4923
        - GOUT, 4923
    - VIRUS, C-TYPE BABOON
        - DNA-RNA HYBRIDIZATION, 5010
        - RNA, VIRAL, 5010
    - VIRUS, GIBBON APE LEUKEMIA
        - DNA-RNA HYBRIDIZATION, 4865*
        - HORIZONTAL TRANSMISSION, 4865*
        - REVERSE TRANSCRIPTASE, 4865*
        - VIRUS-LIKE PARTICLES, 4865*
    - VIRUS, RNA TUMOR
        - DNA-RNA HYBRIDIZATION, 4865*
        - REVERSE TRANSCRIPTASE, 4865*
        - VIRUS-LIKE PARTICLES, 4865*
    - VIRUS, SENDAI
        - INTERFERON, 5109
    - VIRUS, WOOLLY MONKEY SARCOMA
        - DNA-RNA HYBRIDIZATION, 4865*
        - REVERSE TRANSCRIPTASE, 4865*
        - VIRUS, GIBBON APE LEUKEMIA, 4865*
        - VIRUS-LIKE PARTICLES, 4865*

- LEUKEMIA, PLASMACYTIC
    - CELL DIFFERENTIATION
        - HEMATOPOIETIC STEM CELLS, 5291

- LEUKOCYTES
    - INFECTIOUS MONONUCLEOSIS
        - IMMUNITY, CELLULAR, 5121*
    - LEUKEMIA
        - HISTOLOGICAL STUDY, 5155
    - LEUKEMIA, LYMPHOBLASTIC
        - ELECTROPHORETIC MOBILITY, 5341
        - INTERFERON, 5109
    - LEUKEMIA, LYMPHOCYTIC
        - INTERFERON, 5109
        - ZINC, 5259*
    - LEUKEMIA, MONOBLASTIC
        - ZINC, 5259*
    - LEUKEMIA, MYELOBLASTIC
        - IMMUNOGLOBULINS, SURFACE, 5145*
        - INTERFERON, 5109
    - LEUKEMIA, MYELOCYTIC
        - INTERFERON, 5109
    - LYSINE
        - ULTRASTRUCTURAL STUDY, 5260*
    - SARCOMA, OSTEOGENIC
        - TRANSFER FACTOR, 5223*

- LEUKOCYTOSIS
    - MONOCYTES
        - STATISTICAL ANALYSIS, 5340
    - NEUTROPHILS
        - STATISTICAL ANALYSIS, 5340

- LEUKOENCEPHALOPATHY, PROGRESSIVE MULTIFOCAL
    - LYMPHOMA
        - EPIDEMIOLOGY, MONKEY, 5322*
    - VIRUS, PAPOVA
        - ISOLATION AND CHARACTERIZATION, REVIEW, 4827

- LEUKOPENIA
    - ETHYLENE, CHLORO-
        - OCCUPATIONAL HAZARD, 5191

- LIGHT
    - ALANINE
        - MUTAGENIC ACTIVITY, 5363*
    - DNA
        - MUTAGENIC ACTIVITY, 5363*
    - VIRUS, HERPES SIMPLEX 2
        - ACRIDINE, 3,6-DIAMINO-, 5089*
        - CELL TRANSFORMATION, NEOPLASTIC, 5089*

- LIP NEOPLASMS
    - EPIDEMIOLOGY
        - UTAH, 5293*

- LIPIDS
    - HEPATOMA
        - STEARIC ACID, 5342
    - MAMMARY NEOPLASMS, EXPERIMENTAL
        - DNA, NEOPLASM, 5379*
        - TISSUE CULTURE, 5379*
    - MELANOMA
        - URIDINE, 5-BROMO-2'-DEOXY-, 5375*
    - VIRUS, SV40
        - CELL MEMBRANE, 5068*
        - KIDNEY, DOG, 5068*

- LIPOMA
    - NEOPLASMS, MULTIPLE PRIMARY
        - CASE REPORT, 5252*

- LIPOPOLYSACCHARIDES
    - VIRUS, C-TYPE RNA TUMOR
        - VIRUS INDUCTION, 5031

- LIVER CIRRHOSIS
    - ACETAMIDE, N-FLUOREN-2-YL-
        - GENETICS, 4888
    - ACETAMIDE, N-FLUOREN-2-YLDI-
        - GENETICS, 4888
    - CHOLANGIOMA
        - CLONORCHIASIS, 5194
    - HEPATOMA
        - CLONORCHIASIS, 5194
    - LIVER NEOPLASMS
        - EPIDEMIOLOGY, UNITED STATES, 5304*
    - LYMPHOMA
        - CLONORCHIASIS, 5194

- LIVER NEOPLASMS
    - SEE ALSO HEPATOMA
    - ACETAMIDE, N-FLUOREN-2-YL-
        - ALDEHYDE OXIDOREDUCTASES, 4934*
    - ADENOCARCINOMA
        - TRANSPLANTATION, HOMOLOGOUS, 4898
    - ANGIOSARCOMA
        - ETHYLENE, CHLORO-, 5193
        - ETHYLENE, CHLORO POLYMER, 5284
    - ANILINE, N,N-DIMETHYL-P-PHENYLAZO-
        - ALDEHYDE OXIDOREDUCTASES, 4934*
    - BUTYRIC ACID, 2-AMINO-4-(ETHYLTHIO)-
        - ALDEHYDE OXIDOREDUCTASES, 4934*
    - CHOLANGIOMA
        - CLONORCHIASIS, 5194
    - DIETHYLAMINE, N-NITROSO-
        - CELL TRANSFORMATION, NEOPLASTIC,

4896
- PCLYRIBOSOMES, 4896
- EPIDEMIOLOGY
  - ALASKA, NATIVES, 5294*
- ETHYLENE, CHLORO-
  - ANTIBODIES, 5191
  - HISTOLOGICAL STUDY, 5192, 5193
  - OCCUPATIONAL HAZARD, 5191, 5192
  - PRECANCEROUS CONDITIONS, 5192
- HEMANGIOENDOTHELIOMA
  - ETHYLENE, CHLORO-, 5191
- HEPATITIS
  - EPIDEMIOLOGY, UNITED STATES, 5304*
- LIVER CIRRHOSIS
  - EPIDEMIOLOGY, UNITED STATES, 5304*
- OCCUPATIONAL HAZARD
  - EPIDEMIOLOGY, UNITED STATES, 5304*
- PRECANCEROUS CONDITIONS
  - ETHYLENE, CHLORO-, 5191
- RACIAL FACTORS
  - EPIDEMIOLOGY, UNITED STATES, 5304*
- TRANSPLANTATION, HOMOLOGOUS
  - CELL DIFFERENTIATION, 4898
- VIRUS, ADENO 12
  - HISTOCHEMICAL STUDY, HAMSTER, 5083*
  - ULTRASTRUCTURAL STUDY, HAMSTER, 5083*

LUNG
- SARCOMA, OSTEOGENIC
  - NEOPLASM METASTASIS, 5224*

LUNG NEOPLASMS
- ADENOCARCINOMA
  - HISTOLOGICAL STUDY, PERIFOCAL INFLAMMATION, 5187
  - STERIGMATOCYSTIN, 4802
- ADENOMA
  - STERIGMATOCYSTIN, 4802
- ALPHA PARTICLES
  - PARTICLE DISTRIBUTION, REVIEW, 4866*
- ARSENIC
  - REVIEW, 4813
- ASBESTOS
  - PRECANCEROUS CONDITIONS, 4884
- BENZO(A)PYRENE
  - DOSE-RESPONSE STUDY, 4929*
- CARBAMIC ACID, ETHYL ESTER
  - AGE FACTORS, MOUSE, 4941*
  - TRANSPLACENTAL CARCINOGENESIS, MOUSE, 4941*
- CARCINOMA
  - HISTOLOGICAL STUDY, PERIFOCAL INFLAMMATION, 5187
- CARCINOMA, EPIDERMOID
  - BENZO(A)PYRENE, 4929*
  - HISTOLOGICAL STUDY, PERIFOCAL INFLAMMATION, 5187
- CERIUM RADIOISOTOPES
  - DOSE-RESPONSE STUDY, 4978*
  - HISTOLOGICAL STUDY, BEAGLE, 4978*
- EPIDEMIOLOGY
  - UNITED STATES, 5320*
- ETHNIC GROUPS
  - EPIDEMIOLOGY, SINGAPORE, 5292*
- LYMPHANGIECTASIS
  - CASE REPORT, 5189
  - PNEUMOTHORAX, 5189
  - ULTRASTRUCTURAL STUDY, 5189
- NEOPLASM METASTASIS
  - DOUBLING TIME, 5224*
- PLUTONIUM
  - ANTIGENIC DETERMINANTS, 4980*
- RADIOISOTOPES
  - ALPHA PARTICLES, 4866*
- SARCOMA, RETICULUM CELL
  - BENZO(A)PYRENE, 4929*
- SMOKING
  - EPIDEMIOLOGY, REVIEW, 5280
  - OXYGENASES, 4805
- SOCIOECONOMIC FACTORS
  - DIAGNOSIS AND PROGNOSIS, 5295*
- STERIGMATOCYSTIN
  - CARCINOGENIC ACTIVITY, MOUSE, 4802
  - ISOLATION AND CHARACTERIZATION, 4802
- TUBERCULOSIS, PLEURAL
  - EPIDEMIOLOGY, 5278

LYMPH NODES
- CERIUM RADIOISOTOPES
  - DOSE-RESPONSE STUDY, 4978*
  - HISTOLOGICAL STUDY, BEAGLE, 4978*
- NEOPLASM METASTASIS
  - MICROCIRCULATION, 5116*
- SARCOMA
  - DNA REPLICATION, 5118*

LYMPHADENTIS
- VIRUS, EPSTEIN-BARR
  - MARMOSET, 5025

LYMPHANGIECTASIS
- LUNG NEOPLASMS
  - CASE REPORT, 5189
  - PNEUMOTHORAX, 5189
  - ULTRASTRUCTURAL STUDY, 5189

LYMPHATIC DISEASES
- IMMUNOLOGIC DEFICIENCY SYNDROMES
  - CASE REPORT, 5150

LYMPHATIC NEOPLASMS
- CERIUM RADIOISOTOPES
  - HISTOLOGICAL STUDY, BEAGLE, 4978*
- GLUTAMYL TRANSPEPTIDASE
  - ISOLATION AND CHARACTERIZATION, 5356
- HODGKIN'S DISEASE
  - CASE REPORT, 5149
  - EPIDEMIOLOGY, HAMSTER, 5277
- LYMPHOMA
  - EPIDEMIOLOGY, HAMSTER, 5277
- VIRUS, BOVINE LEUKEMIA
  - SUBCELLULAR FRACTIONS, 5005

LYMPHOCYTE TRANSFORMATION
- AFLATOXIN B1
  - SELENIOUS ACID, DISODIUM SALT, 4947*
- HEPATOMA
  - FETAL GLOBULINS, 5103
- HODGKIN'S DISEASE
  - PLANT AGGLUTININS, 5299*
- SARCOMA
  - CHOLANTHRENE, 3-METHYL-, 5118*

    - MITOMYCIN C, 5118*
  - VIRUS, EPSTEIN-BARR
    - ANTIBODIES, VIRAL, 5026
    - ANTIGENS, VIRAL, 5026
  - VIRUS, HERPES SAIMIRI
    - ANTIGENS, VIRAL, 5015
    - PLANT AGGLUTININS, 5015
  - VIRUS, MURINE LEUKEMIA
    - VIRAL COMPONENTS, REVIEW, 5051*

- LYMPHOCYTES
  - CELL MEMBRANE
    - CELL MOVEMENT, REVIEW, 4831
  - COLONIC NEOPLASMS
    - IMMUNITY, CELLULAR, 5125*
  - CONCANAVALIN A
    - CELL MOVEMENT, REVIEW, 4831
    - IMMUNE RESPONSE, REVIEW, 4831
  - GLIOMA
    - IMMUNITY, CELLULAR, 5113*
  - LEUKEMIA
    - HISTOLOGICAL STUDY, 5155
  - LEUKEMIA, HAIRY CELL
    - ACID PHOSPHATASE, 5255*
    - IMMUNOGLOBULINS, SURFACE, 5255*
  - LEUKEMIA, LYMPHOBLASTIC
    - MIGRATION INHIBITORY FACTOR, 5128*
  - LEUKEMIA, LYMPHOCYTIC
    - IMMUNITY, CELLULAR, 5124*
    - MICROCYTOTOXICITY, 5124*
  - LYMPHOSARCOMA
    - ANTIBODIES, 5102
    - COMPLEMENT, 5102
    - IMMUNOGLOBULINS, SURFACE, 5102
    - ULTRASTRUCTURAL STUDY, 5102
  - MELANOMA
    - IMMUNITY, CELLULAR, 5125*
  - PERITONEAL CAVITY
    - ULTRASTRUCTURAL STUDY, MOUSE, 5210
  - PROTEINS
    - CELL MOVEMENT, REVIEW, 4831
  - RADIATION, IONIZING
    - CHROMOSOME ABERRATIONS, 4977*
  - SURFACE PROPERTIES
    - CELL MOVEMENT, REVIEW, 4831
  - VIRUS, HERPES SAIMIRI
    - CELL TRANSFORMATION, NEOPLASTIC, 5014
    - IMMUNE SERUMS, 5016
  - VIRUS, MAREK'S DISEASE HERPES
    - IMMUNE RESPONSE, 4989

- B-LYMPHOCYTES
  - CARBAMIC ACID, ETHYL ESTER
    - BONE MARROW CELLS, 5105
    - IMMUNE RESPONSE, THYMUS, RAT, 5105
  - HODGKIN'S DISEASE
    - IMMUNOGLOBULINS, 5151
  - INFECTIOUS MONONUCLEOSIS
    - IMMUNE RESPONSE, 5121*
  - ISOANTIGENS
    - ISOLATION AND CHARACTERIZATION, 4870*
  - LEUCOSARCOMA
    - IMMUNOGLOBULINS, SURFACE, 5101
  - LEUKEMIA
    - UREA, METHYL NITROSO-, 4894
  - LEUKEMIA, HAIRY CELL
    - CELL DIFFERENTIATION, 5255*
  - LEUKEMIA, LYMPHOBLASTIC
    - IMMUNOGLOBULINS, SURFACE, 5101
    - ROSETTE FORMATION, 5096
  - LEUKEMIA, LYMPHOCYTIC
    - GLUTAMYL TRANSPEPTIDASE, 5356
    - IGM, 5101
    - IMMUNOGLOBULINS, SURFACE, 5101
  - LEUKEMIA, MYELOBLASTIC
    - ISOANTIGENS, 5126*
  - T-LYMPHOCYTES
    - IMMUNE RESPONSE, 4872*
  - LYMPHOMA
    - VIRUS, MAREK'S DISEASE HERPES, 5107
  - LYMPHOMA, GIANT FOLLICULAR
    - IMMUNOGLOBULINS, 5151
  - LYMPHOSARCOMA
    - CHILD, 5102
  - MULTIPLE MYELOMA
    - GLUTAMYL TRANSPEPTIDASE, 5356
  - PORPHYRIA
    - HEMOPEXIN, 5104
    - IMMUNOGLOBULINS, 5104
  - RADIATION, IONIZING
    - BONE MARROW CELLS, 4964
  - SARCOMA
    - IMMUNITY, CELLULAR, 5122*
    - VIRUS, RETICULOENDOTHELIOSIS, 5119*
  - SARCOMA, RETICULUM CELL
    - IMMUNOGLOBULINS, 5151
  - SARCOMA, YOSHIDA
    - TRANSPLANTATION IMMUNOLOGY, 5120*
  - VIRUS, C-TYPE RNA TUMOR
    - VIRUS INDUCTION, 4997, 5031
  - VIRUS, EPSTEIN-BARR
    - CELL TRANSFORMATION, NEOPLASTIC, 5091*
    - DNA, VIRAL, 5091*
  - VIRUS, FRIEND MURINE LEUKEMIA
    - IMMUNE RESPONSE, MOUSE, 5108
    - IMMUNOSUPPRESSION, 5108
  - VIRUS, MAREK'S DISEASE HERPES
    - VIRUS REPLICATION, 5107
  - VIRUS, ROWSON-PARR MURINE LEUKEMIA
    - IMMUNE RESPONSE, MOUSE, 5108
    - IMMUNOSUPPRESSION, 5108

- T-LYMPHOCYTES
  - BREAST NEOPLASMS
    - IMMUNE SERUMS, 5139*
  - CARBAMIC ACID, ETHYL ESTER
    - BONE MARROW CELLS, 5105
    - IMMUNE RESPONSE, THYMUS, RAT, 5105
  - COLONIC NEOPLASMS
    - IMMUNITY, CELLULAR, 5125*
  - ERYTHRODERMA
    - BRAIN, 5106
  - HEPATOMA
    - PORPHYRIA, 5104
  - IMMUNE SERUMS
    - BRAIN, 5106
  - INFECTIOUS MONONUCLEOSIS
    - IMMUNE RESPONSE, 5121*
  - LEUKEMIA
    - ANTIGENIC DETERMINANTS, 5094
    - ANTIGENS, NEOPLASM, 5094
    - HISTOCOMPATIBILITY ANTIGENS, 5094
    - VIRUS, FRIEND MURINE LEUKEMIA,

4999

    - VIRUS, GRAFFI MURINE LEUKEMIA, 4999
    - VIRUS, MURINE LEUKEMIA, 4999
    - VIRUS, RAUSCHER MURINE LEUKEMIA, 4999
  - LEUKEMIA, LYMPHOBLASTIC
    - BRAIN, 5106
    - ROSETTE FORMATION, 5096
  - LEUKEMIA, LYMPHOCYTIC
    - BRAIN, 5106
    - GLUTAMYL TRANSPEPTIDASE, 5356
  - B-LYMPHOCYTES
    - IMMUNE RESPONSE, 4872*
  - LYMPHOMA
    - VIRUS, MAREK'S DISEASE HERPES, 5107
  - LYMPHOSARCOMA
    - CHILD, 5102
    - ROSETTE FORMATION, 5102
  - MULTIPLE MYELOMA
    - GLUTAMYL TRANSPEPTIDASE, 5356
  - NEOPLASM METASTASIS
    - IMMUNE RESPONSE, 4872*
  - PORPHYRIA
    - HEMOPEXIN, 5104
    - IMMUNOGLOBULINS, 5104
  - SARCOMA
    - IMMUNITY, CELLULAR, 5122*
  - SARCOMA, YOSHIDA
    - IMMUNITY, CELLULAR, 5120*
    - TRANSPLANTATION IMMUNOLOGY, 5120*
  - THYMOMA
    - SURFACE MARKERS, 5115*
  - VIRUS, C-TYPE RNA TUMOR
    - VIRUS INDUCTION, 4997, 5031
  - VIRUS, FRIEND MURINE LEUKEMIA
    - IMMUNE RESPONSE, MOUSE, 5108
    - IMMUNOSUPPRESSION, 5108
  - VIRUS, HERPES SAIMIRI
    - VIRUS REPLICATION, 5073*
  - VIRUS, MAREK'S DISEASE HERPES
    - VIRUS REPLICATION, 5107
  - VIRUS, ROWSON-PARR MURINE LEUKEMIA
    - IMMUNE RESPONSE, MOUSE, 5108
    - IMMUNOSUPPRESSION, 5108

- LYMPHOMA (GENERAL AND UNSPECIFIED)
  - SEE ALSO HODGKIN'S DISEASE/BURKITT'S LYMPHOMA/SARCOMA, RETICULUM CELL/LYMPHOSARCOMA
  - ANIMAL DISEASES
    - TRANSMISSION, REVIEW, 4836
  - CELIAC DISEASE
    - EPIDEMIOLOGY, 5316*
  - CHALONES
    - REVIEW, 4856
  - CHOLERA
    - ADENOSINE CYCLIC 3',5' MONOPHOSPHATE, 4949*
    - ADENYL CYCLASE, 4949*
  - EPIDEMIOLOGY
    - UNITED STATES, 5320*
  - EYE NEOPLASMS
    - REVIEW, 5152
  - EYELID NEOPLASMS
    - REVIEW, 5152
  - GEOGRAPHY
    - EPIDEMIOLOGY, REVIEW, 4837
  - HORIZONTAL TRANSMISSION
    - CASE-CONTROL STUDY, 5301*
  - HYBRID CELLS
    - HISTOCOMPATIBILITY ANTIGENS, 5093
    - ISOANTIGENS, 5093
  - LEUKOENCEPHALOPATHY, PROGRESSIVE MULTIFOCAL
    - EPIDEMIOLOGY, MONKEY, 5322*
  - LIVER CIRRHOSIS
    - CLONORCHIASIS, 5194
  - LYMPHATIC NEOPLASMS
    - EPIDEMIOLOGY, HAMSTER, 5277
  - MEDIASTINAL NEOPLASMS
    - CASE REPORT, CASTLEMAN TUMOR, 5251*
  - MYELOPROLIFERATIVE DISORDERS
    - EPIDEMIOLOGY, CAT, 5322*
  - ORBITAL NEOPLASMS
    - REVIEW, 5152
  - STOMACH NEOPLASMS
    - CLASSIFICATION, REVIEW, 5302*
    - DIAGNOSIS AND TREATMENT, REVIEW, 5302*
    - EPIDEMIOLOGY, REVIEW, 5302*
  - VIRUS, FELINE LEUKEMIA
    - HORIZONTAL TRANSMISSION THEORY, 5322*
  - VIRUS, HERPES SAIMIRI
    - IMMUNE SERUMS, 5016
  - VIRUS, MAREK'S DISEASE HERPES
    - ANTIBODIES, VIRAL, 4988
    - ANTIGENS, VIRAL, 4988
    - IMMUNE RESPONSE, 4989
    - B-LYMPHOCYTES, 5107
    - T-LYMPHOCYTES, 5107
    - VIRUS REPLICATION, 4989
  - VIRUS, PAPOVA
    - CELL TRANSFORMATION, NEOPLASTIC, 4995

- LYMPHOMA, GIANT FOLLICULAR
  - IMMUNOGLOBULINS
    - MURAMIDASE, 5151
  - B-LYMPHOCYTES
    - IMMUNOGLOBULINS, 5151

- LYMPHOSARCOMA
  - CELL MEMBRANE
    - CONCANAVALIN A, 5261*
    - GLYCOPROTEINS, 5261*
    - HEXOSES, 5261*
    - PLANT AGGLUTININS, 5261*
  - CHILD
    - T-LYMPHOCYTES, 5102
  - HYDANTOIN, 5,5-DIPHENYL-
    - CASE REPORT, 4913
  - IMMUNOLOGIC DEFICIENCY SYNDROMES
    - REVIEW, 4833
  - LYMPHOCYTES
    - ANTIBODIES, 5102
    - COMPLEMENT, 5102
    - IMMUNOGLOBULINS, SURFACE, 5102
    - ULTRASTRUCTURAL STUDY, 5102
  - B-LYMPHOCYTES
    - CHILD, 5102
  - T-LYMPHOCYTES
    - ROSETTE FORMATION, 5102

    NEOPLASM METASTASIS
        EPIDEMIOLOGY, FISH, 5321*
    NEOPLASM REGRESSION, SPONTANEOUS
        EPIDEMIOLOGY, FISH, 5321*
    NEUTRONS
        HISTOLOGICAL STUDY, MOUSE, 4972*
        INCIDENCE RATES, 4973*
    RADIATION, IONIZING
        HISTOLOGICAL STUDY, MOUSE, 4972*
        INCIDENCE RATES, 4973*
    TRANSPLANTATION, HOMOLOGOUS
        CELL DIFFERENTIATION, 4898
    VIRUS, C-TYPE RNA TUMOR
        ISOLATION AND CHARACTERIZATION, 5032
        VIRUS REPLICATION, 5032
    VIRUS, FELINE LEUKEMIA
        EPIDEMIOLOGY, 5061*

LYSINE
    LEUKOCYTES
        ULTRASTRUCTURAL STUDY, 5260*

MACROPHAGES
    CELL FUSION
        HYBRID CELLS, 5071*
    HISTOCOMPATIBILITY ANTIGENS
        ISOLATION AND CHARACTERIZATION, 4870*
    ISOANTIBODIES
        ISOLATION AND CHARACTERIZATION, 4870*
    ISOANTIGENS
        ISOLATION AND CHARACTERIZATION, 4870*
    PERITONEAL CAVITY
        ULTRASTRUCTURAL STUDY, MOUSE, 5210
    VIRUS, C-TYPE RNA TUMOR
        VIRUS INDUCTION, 4997
    VIRUS, FRIEND MURINE LEUKEMIA
        IMMUNE RESPONSE, MOUSE, 5108
        IMMUNOSUPPRESSION, 5108
    VIRUS, ROWSON-PARR MURINE LEUKEMIA
        IMMUNE RESPONSE, MOUSE, 5108
        IMMUNOSUPPRESSION, 5108
    VIRUS, SV40
        CELL TRANSFORMATION, NEOPLASTIC, 5098
        RECEPTORS, IMMUNOGLOBULINS, FC, 5098

MALATE DEHYDROGENASE
    GYNECOLOGIC NEOPLASMS
        LEIOMYOMA, 5345
        PRECANCEROUS CONDITIONS, 5345

MALIC ACID
    HEPATOMA
        METABOLISM, RAT LIVER, 5371*

MAMMARY NEOPLASMS, EXPERIMENTAL
    ADENOCARCINOMA
        CONTACT INHIBITION, 5377*
    ADENOFIBROMA
        TRITIUM, 4959
    ARSENIC TRIOXIDE
        ANTICARCINOGENIC EFFECT, REVIEW, 5331*
        EPIDEMIOLOGY, REVIEW, 5331*
    BENZ(A)ANTHRACENE, 7,12-DIMETHYL-
        DNA REPLICATION, 4910
        ESTRUS, 4910
        PEROXIDASES, 5360
        PROLACTIN, 4910
    CELLS, CULTURED
        CONTACT INHIBITION, 5377*
    DIBUTYRYL CYCLIC AMP
        CELL DIFFERENTIATION, 5390*
    DNA NUCLEOTIDYLTRANSFERASES
        CELL CYCLE KINETICS, 5353
    ESTRADIOL
        CELL DIFFERENTIATION, 5390*
    ESTRUS
        DNA REPLICATION, 4910
    INSULIN
        DNA, NEOPLASM, 5379*
        TISSUE CULTURE, 5379*
    LIPIDS
        DNA, NEOPLASM, 5379*
        TISSUE CULTURE, 5379*
    PEROXIDASES
        ISOLATION AND CHARACTERIZATION, 5360
    PHENOTHIAZINE, 2-CHLORO-10-(3-(DIMETHYL-AMINO)PROPYL)-
        PROLACTIN, 4943*
    PROGESTERONE
        REVIEW, 4854
    PROLACTIN
        ESTRUS, 4910
        TISSUE CONCENTRATION, RAT, 4943*
    SELENIUM
        ANTICARCINOGENIC EFFECT, REVIEW, 5331*
    TRITIUM
        RADIATION DOSAGE, 4959

MAMMOGRAPHY
    AGE FACTORS
        SCREENING, CRITERIA, 4985*
    BREAST NEOPLASMS
        AGE FACTORS, 4985*

MAST CELLS
    PERITONEAL CAVITY
        ULTRASTRUCTURAL STUDY, MOUSE, 5210

MEDIASTINAL NEOPLASMS
    LYMPHOMA
        CASE REPORT, CASTLEMAN TUMOR, 5251*

MELANOCYTES
    PROTEINS
        MOUSE, COAT COLOR MUTANT, 5398*

MELANOMA
    ADENOSINE CYCLIC 3',5' MONOPHOSPHATE
        GROWTH, 5385*
    ALANINE, 3-(3,4-DIHYDROXYPHENYL)-
        FLUORESCENCE, 5156
    ANTIBODY SPECIFICITY
        MEMBRANE IMMUNOFLUORESCENCE ASSAY, 5134*
    ANTIGENS, NEOPLASM
        ANTIBODY SPECIFICITY, 5134*
    CHALONES
        REVIEW, 4856

  - CORTICOTROPIN
    - ADENOSINE CYCLIC 3',5' MONOPHOSPHATE, 5387*
    - SURFACE PROPERTIES, 5387*
  - DENDRITES
    - FLUORESCENCE, 5156
  - DIBUTYRYL CYCLIC AMP
    - GROWTH, 5385*
  - EPINEPHRINE
    - ADENOSINE CYCLIC 3',5' MONOPHOSPHATE, 5388*
  - HISTOLOGICAL STUDY
    - CLASSIFICATION, 5158
    - DIAGNOSIS AND PROGNOSIS, 5158
    - EPIDEMIOLOGY, 5158
  - HYDROCHLORIC ACID
    - FLUORESCENCE, 5156
  - ISOPROTERENOL
    - ADENOSINE CYCLIC 3',5' MONOPHOSPHATE, 5388*
  - LEUKEMIA, LYMPHOCYTIC
    - IMMUNITY, CELLULAR, 5124*
  - LYMPHOCYTES
    - IMMUNITY, CELLULAR, 5125*
  - MSH
    - ADENOSINE CYCLIC 3',5' MONOPHOSPHATE, 5387*
    - GROWTH, 5385*
    - SURFACE PROPERTIES, 5387*
  - PHOSPHODIESTERASES
    - ISOLATION AND CHARACTERIZATION, 5374*
    - KINETIC STUDY, 5374*
  - THEOPHYLLINE
    - ADENOSINE CYCLIC 3',5' MONOPHOSPHATE, 5388*
  - THYMIDINE
    - DNA, 5384*
    - SURFACE PROPERTIES, 5384*
  - URIDINE, 5-BROMO-2'-DEOXY-
    - DEOXY SUGARS, 5375*
    - DNA, 5384*
    - LIPIDS, 5375*
    - SURFACE PROPERTIES, 5375*, 5384*
  - URIDINE, 2'-DEOXY-5-ETHYL-
    - DNA, 5384*
    - SURFACE PROPERTIES, 5384*
  - XANTHINE, 3-ISOBUTYL-1-METHYL-
    - ADENOSINE CYCLIC 3',5' MONOPHOSPHATE, 5388*

- MELANOSIS
  - ALANINE, 3-(3,4-DIHYDROXYPHENYL)-
    - FLUORESCENCE, 5156
  - HYDROCHLORIC ACID
    - FLUORESCENCE, 5156

- MENINGIOMA
  - BRAIN NEOPLASMS
    - RADIATION, IONIZING, 5221*
  - CHROMOSOME ABERRATIONS
    - REVIEW, 4873*
  - RADIATION, IONIZING
    - CASE REPORT, 5221*

- MENOPAUSE
  - BREAST NEOPLASMS
    - ESTROGENS, 5166
  - UTERINE NEOPLASMS
    - ESTROGENS, 4855

- MENSTRUATION
  - BREAST NEOPLASMS
    - ESTROGENS, 5166

- MESOTHELIOMA
  - HEART NEOPLASMS
    - CASE REPORT, 5245*
  - NEOPLASM TRANSPLANTATION
    - HISTOLOGICAL STUDY, HAMSTER, 5209
  - PERITONEAL NEOPLASMS
    - ASBESTOS, 5285
    - EPIDEMIOLOGY, 5285
    - OCCUPATIONAL HAZARD, 5285
  - PLEURAL NEOPLASMS
    - ASBESTOS, 5285, 5286
    - EPIDEMIOLOGY, 5285
    - OCCUPATIONAL HAZARD, 5285
  - RESPIRATORY TRACT NEOPLASMS
    - ASBESTOS, 4930*

- METAPLASIA
  - STOMACH NEOPLASMS
    - LACTATE DEHYDROGENASE, 5229*

- METHANE, AZO-
  - HYDRAZINE, 1,2-DIMETHYL-
    - CARCINOGENIC METABOLITE, 4940*

- METHANE, SULFINYLBIS-
  - ERYTHROLEUKEMIA
    - CELL CYCLE KINETICS, 5349, 5350
    - CELL DIFFERENTIATION, 4998
    - GLOBIN, 5349, 5350
    - HEMOGLOBINS, 4998
    - RNA, MESSENGER, 5349, 5350
  - VIRUS, FRIEND MURINE LEUKEMIA
    - CELL DIFFERENTIATION, 5045*

- METHANESULFONIC ACID
  - HYPERBARIC OXYGENATION
    - MUTAGENIC ACTIVITY, 4882
  - SALMONELLA TYPHIMURIUM
    - HYPERBARIC OXYGENATION, 4882

- METHANESULFONIC ACID, METHYL ESTER
  - MUTAGENIC ACTIVITY, YEAST
    - SCREENING METHOD, 4880

- METHANESULFONIC ACID, THIO-, S-METHYL ESTER
  - LEUKEMIA L1210
    - CELL DIVISION, 5336
  - PLASMACYTOMA
    - CELL DIVISION, 5336
  - SARCOMA, RETICULUM CELL
    - CELL DIVISION, 5336

- METHANOL, (METHYL-ONN-AZOXY)-, ACETATE (ESTER)
  - BRAIN NEOPLASMS
    - MYOBLASTOMA, 5183

- N-METHYL-N'-NITRO-N-NITROSOGUANIDINE
  - SEE GUANIDINE, 1-METHYL-3-NITRO-1-NITROSO-

- METHYL SULFOXIDE

    SEE METHANE, SULFINYLBIS-

3-METHYLCHOLANTHRENE
    SEE CHOLANTHRENE, 3-METHYL-

METHYLTRANSFERASES
    VIRUS, FRIEND MURINE LEUKEMIA
        SPLEEN, 5047*
        VIRUS REPLICATION, 5047*
    VIRUS, RAUSCHER MURINE LEUKEMIA
        SPLEEN, 5047*
        VIRUS REPLICATION, 5047*

MICROCIRCULATION
    CARCINOMA
        NEOPLASM METASTASIS, 5116*
    NEOPLASM METASTASIS
        LYMPH NODES, 5116*

MICROSOMES, LIVER
    BENZ(A)ANTHRACENE, 7-METHYL-
        DNA, 4911
    BENZO(A)PYRENE
        AMINOPYRINE N-DEMETHYLASE, 4909
        CARCINOGENIC METABOLITE, 4906
        CYTOCHROME P-450, 4909
        CYTOCHROMES, 4909
        HYDROXYLASES, 4909
        K-REGION EPOXIDES, 4907
        QUANTITATION METHOD, 4906
    CHOLANTHRENE, 3-METHYL-
        BENZ(A)ANTHRACENE, 7-METHYL-, 4911
    DIMETHYLAMINE, N-NITROSO-
        ALKYLATION, 4895
    HEPATOMA
        CHOLESTEROL, 5358
        GROWTH SUBSTANCES, 5383*
    HYDRAZINE, 1,2-DIMETHYL-
        ALKYLATION, 4895
    NITROSAMINES
        ALKYLATION, 4895
    TRIAZENE, 3,3-DIMETHYL-1-PHENYL-
        ALKYLATION, 4895

MICROTUBULES
    L CELLS
        GLYCOPROTEINS, 5399*

MIGRATION INHIBITORY FACTOR
    LEUKEMIA, LYMPHOBLASTIC
        LYMPHOCYTES, 5128*

MITOCHONDRIA
    CHOLERA
        ADENOSINE CYCLIC 3',5'
          MONOPHOSPHATE, 4949*
        IMMUNOGLOBULINS, FC, 4949*
        IMMUNOGLOBULINS, SURFACE, 4949*
    VIRUS, ROUS SARCOMA
        DNA NUCLEOTIDYLTRANSFERASES, 4993
        DNA REPLICATION, 5036*
        REVERSE TRANSCRIPTASE, 4993

MITOCHONDRIA, LIVER
    HEPATOMA
        PROTEIN KINASE, 5355

MITOGENS
    HODGKIN'S DISEASE
        EPIDEMIOLOGY, 5299*, 5300*

MITOMYCIN C
    SARCOMA
        LYMPHOCYTE TRANSFORMATION, 5118*

MITRAL VALVE STENOSIS
    CARCINOMA, BRONCHIOLAR
        CASE REPORT, 5188

MIXED FUNCTION OXIDASE
    SEE OXIDOREDUCTASES

MONOCYTES
    LEUKEMIA, MYELOCYTIC
        STATISTICAL ANALYSIS, 5340
        ULTRASTRUCTURAL STUDY, ACID
          MUCOSUBSTANCE, 5258*
    LEUKOCYTOSIS
        STATISTICAL ANALYSIS, 5340

MORPHOLINE, 4-NITROSO-
    RIBONUCLEOTIDES
        LVIER, RAT, 4917
    RNA, RIBOSOMAL
        CELL TRANSFORMATION, NEOPLASTIC,
          4917
        LIVER, RAT, 4917

MOSAICISM
    GENETICS
        IMMUNE RESPONSE, MOUSE, 4832

MOUTH NEOPLASMS
        EPIDEMIOLOGY, SRI LANKA, 5281
    PRECANCEROUS CONDITIONS
        EPIDEMIOLOGY, SRI LANKA, 5281

MSH
    MELANOMA
        ADENOSINE CYCLIC 3',5'
          MONOPHOSPHATE, 5387*
        GROWTH, 5385*
        SURFACE PROPERTIES, 5387*

MUCOPOLYSACCHARIDES
    GYNECOMASTIA
        ISOLATION AND CHARACTERIZATION,
          5344
    SALIVARY GLAND NEOPLASMS
        ADENOMA, 5219*
        CELLS, CULTURED, 5219*

MULLERIAN DUCTS
    4,4'-STILBENEDIOL, ALPHA,ALPHA'-
      DIETHYL-
        CELL DIFFERENTIATION, 4944*
        CHICK EMBRYO, 4944*
        RECEPTORS, HORMONE, 4944*

MULTIPLE MYELOMA
    COLCHICINE
        CASE REPORT, 4923
        GOUT, 4923
    DNA, VIRAL
        IMMUNOGLOBULINS, 5144*
    HYBRID CELLS
        CONTACT INHIBITION, 5112

  - IGE, 5112
  - IMMUNOGLOBULINS, HEAVY CHAIN, 5112
  - IMMUNOGLOBULINS, LIGHT CHAIN, 5112
- B-LYMPHOCYTES
  - GLUTAMYL TRANSPEPTIDASE, 5356
- T-LYMPHOCYTES
  - GLUTAMYL TRANSPEPTIDASE, 5356
- RNA, MESSENGER
  - IMMUNOGLOBULINS, 5144*
- SULFINPYRAZONE
  - CASE REPORT, 4923
  - GOUT, 4923
- VIRUS, AVIAN MYELOBLASTOSIS
  - DNA-RNA HYBRIDIZATION, 5144*

MURAMIDASE
- HODGKIN'S DISEASE
  - IMMUNOGLOBULINS, 5151
- LYMPHOMA, GIANT FOLLICULAR
  - IMMUNOGLOBULINS, 5151
- SARCOMA, RETICULUM CELL
  - IMMUNOGLOBULINS, 5151

MUTAGENS
- WATER POLLUTANTS
  - AMES TEST, 4928*

MUTATION
- CYTOCHROME P-450
  - ARYL HYDROCARBON HYDROXYLASES, 4859*
  - CARCINOGEN, CHEMICAL, 4859*
  - HYDROXYLASES, 4859*
- KARYOTYPING
  - MULTIPLE TRANSPLANTS, 5369*
  - NEOPLASM TRANSPLANTATION, 5369*

MYCOPLASMA INFECTIONS
- CERVIX NEOPLASMS
  - VAGINAL SMEARS, 5176
- OVARIAN NEOPLASMS
  - PRECANCEROUS CONDITIONS, 5176
- UTERINE NEOPLASMS
  - PRECANCEROUS CONDITIONS, 5176

MYCOTOXINS
- BRAIN NEOPLASMS
  - MYOBLASTOMA, 5183
- CARCINOGENIC ACTIVITY
  - REVIEW, 4811
- HEPATOMA
  - REVIEW, 4812

MYELOFIBROSIS
- NEUTROPHILS
  - STATISTICAL ANALYSIS, 5340

MYELOMA
- SEE MULTIPLE MYELOMA

MYELOMA PROTEINS
- GENETICS
  - DNA-RNA HYBRIDIZATION, 5100
- IGG
  - BINDING, MACROPHAGES, 5098
- IMMUNOGLOBULIN FRAGMENTS
  - DNA, 5100
  - DNA-RNA HYBRIDIZATION, 5100
  - GENETICS, 5100
  - RNA, MESSENGER, 5100
- IMMUNOGLOBULINS, FC
  - BINDING, MACROPHAGES, 5098

MYELOPROLIFERATIVE DISORDERS
- LYMPHOMA
  - EPIDEMIOLOGY, CAT, 5322*
- VIRUS, FELINE LEUKEMIA
  - EPIDEMIOLOGY, 5061*

MYOBLASTOMA
- BRAIN NEOPLASMS
  - CYCASIN, 5183
  - EPIDEMIOLOGY, RAT, 5183
  - HISTOLOGICAL STUDY, RAT, 5183
  - METHANOL, (METHYL-ONN-AZOXY)-, ACETATE (ESTER), 5183
  - MYCOTOXINS, 5183
  - SODIUM IODIDE, 5183

MYXOMA
- HEART NEOPLASMS
  - CASE REPORT, 5244*
  - GENETICS, 5244*

NAD
- CARBOHYDRATES
  - CELL TRANSFORMATION, NEOPLASTIC, 5343
  - FIBROBLASTS, 5343
- VIRUS, SV40
  - CELL DIVISION, 5070*
  - CELL TRANSFORMATION, NEOPLASTIC, 5070*

NADP
- VIRUS, SV40
  - CELL TRANSFORMATION, NEOPLASTIC, 5070*

NAPHTHALENE
- CYTOCHROME P-450
  - MICROSOMES, GUINEA PIG, 4912

2-NAPTHYLAMINE
- DNA
  - BINDING, 4932*
  - CARCINOGENIC METABOLITE, 4932*

NASOPHARYNGEAL NEOPLASMS
- EPIDEMIOLOGY
  - ALASKA, NATIVES, 5294*
- EPITHELIAL CELLS
  - VIRUS REPLICATION, 5090*
- ETHNIC GROUPS
  - EPIDEMIOLOGY, SINGAPORE, 5292*
- VIRUS, EPSTEIN-BARR
  - CARCINOGENIC POTENTIAL, REVIEW, 4824
  - DNA-RNA HYBRIDIZATION, 5027
  - DNA, VIRAL, 5027
  - VIRUS REPLICATION, 5090*

NEOPLASM METASTASIS
- BLADDER NEOPLASMS
  - SOCIOECONOMIC FACTORS, 5307*
- BRONCHIAL NEOPLASMS
  - CARCINOID TUMOR, 5227*
  - CARCINOMA, 5227*

    - CYLINDROMA, 5227*
- CARCINOMA
    - MICROCIRCULATION, 5116*
- CERVIX NEOPLASMS
    - CYTOLOGICAL SCREENING, 5270
    - EPIDEMIOLOGY, 5177
    - EPIDEMIOLOGY, DENMARK, 5270
    - HISTOLOGICAL STUDY, 5177
- COLONIC NEOPLASMS
    - MICROVILLI, 5228*
- FIBROSARCOMA
    - CELL LINE, 5376*
    - CHOLANTHRENE, 3-METHYL-, 5265*
    - TUMOR CELL SUB-POPULATIONS, 5265*
- KIDNEY NEOPLASMS
    - EPIDEMIOLOGY, GERMANY, 5207
    - NEOPLASMS, EMBRYONAL AND MIXED, 5208
- LUNG NEOPLASMS
    - DOUBLING TIME, 5224*
- LYMPH NODES
    - MICROCIRCULATION, 5116*
- T-LYMPHOCYTES
    - IMMUNE RESPONSE, 4872*
- LYMPHOSARCOMA
    - EPIDEMIOLOGY, FISH, 5321*
- PANCREATIC NEOPLASMS
    - EPIDEMIOLOGY, 5238*
- PEPTIDE HYDROLASES
    - REVIEW, 4857
- SARCOMA
    - CYCLOHEXANECARBOXYLIC ACID, 4-(AMINOMETHYL)-, 5211
- SARCOMA, OSTEOGENIC
    - DOUBLING TIME, 5224*
    - LUNG, 5224*
    - TRANSFER FACTOR, 5223*
- STOMACH NEOPLASMS
    - CARCINOMA, 5205
    - PLASMA CELLS, 5205
- THYROID NEOPLASMS
    - EPIDEMIOLOGY, 5311*
- VIRUS, HERPES SIMPLEX 2
    - IMMUNIZATION, 5117*

NEOPLASM RECURRENCE, LOCAL
- BLADDER NEOPLASMS
    - SOCIOECONOMIC FACTORS, 5307*
- COLONIC NEOPLASMS
    - STATISTICAL ANALYSIS, 5308*

NEOPLASM REGRESSION, SPONTANEOUS
- LYMPHOSARCOMA
    - EPIDEMIOLOGY, FISH, 5321*

NEOPLASM TRANSPLANTATION
- CARCINOMA, EHRLICH TUMOR
    - CELL CYCLE KINETICS, 5366*
    - CHROMOSOME ABERRATIONS, 5366*
- CHROMOSOME ABERRATIONS
    - KARYOTYPING, 5369*
- FIBROSARCOMA
    - BRADYKININ, 5067*
    - CARBOXY-LYASES, 5067*
- GLIOBLASTOMA MULTIFORME
    - HISTOLOGICAL STUDY, ATHYMIC MOUSE, 5185
- L CELLS
    - COMPLEMENT, 5143*
    - IMMUNE SERUMS, 5143*
- MESOTHELIOMA
    - HISTOLOGICAL STUDY, HAMSTER, 5209
- MUTATION
    - KARYOTYPING, 5369*
- OVARIAN NEOPLASMS
    - CORTISOL, 5110
    - RADIATION, IONIZING, 5110
- SARCOMA
    - CYCLOHEXANECARBOXYLIC ACID, 4-(AMINOMETHYL)-, 5211
    - VIRUS, PAPOVA, 4995
- SARCOMA, OSTEOGENIC
    - HISTOLOGICAL STUDY, ATHYMIC MOUSE, 5185
- STOMACH NEOPLASMS
    - GUANIDINE, 1-ETHYL-3-NITRO-1-NITROSO-, 4919
    - QUINOLINE, 4-NITRO-, 1-OXIDE, 491
- VIRUS, FRIEND SPLEEN FOCUS-FORMING
    - GENETICS, 5043*
    - IMMUNE RESPONSE, 5043*
    - VIRUS REPLICATION, 5043*

NEOPLASMS (GENERAL AND UNSPECIFIED)
- SEE ALSO UNDER PARTICULAR SITE
- ABNORMALITIES
    - EPIDEMIOLOGY, 5313*
    - EPIDEMIOLOGY, REVIEW, 4840
- ANTIGENIC DETERMINANTS
    - EPIDEMIOLOGY, WEST GERMANY, 5288
- ANTIGENS, NEOPLASM
    - LYMPHOCYTE TRANSFORMATION, DOG, 5111
- BLACKS
    - EPIDEMIOLOGY, US, 5319*
- CHALONES
    - CELL CYCLE KINETICS, 4856
    - REVIEW, 4856
- CHILD
    - EPIDEMIOLOGY, REVIEW, 4840
- CHROMOSOME ABERRATIONS
    - CELL CYCLE KINETICS, 5181
    - CYTODIAGNOSIS, 5181
    - GENETICS, 5180
- EPIDEMIOLOGY
    - ALASKA, NATIVES, 5294*
- EPIDEMIOLOGY, INDONESIA
    - REVIEW, 4838
- EPIDEMIOLOGY, PHILIPPINES
    - REVIEW, 4839
- GENETICS
    - EPIDEMIOLOGY, 5313*
- IMMUNOSUPPRESSION
    - REVIEW, 4835
- INCIDENCE RATES
    - EPIDEMIOLOGY, US, 5319*
- NERVOUS SYSTEM
    - ABNORMALITIES, 5313*
- OCCUPATIONAL HAZARD
    - EPIDEMIOLOGY, UTAH, 5330*
    - RISK ASSESSMENT, METHODOLOGY, 528
- RADIATION EFFECTS
    - ROENTGEN-EQUIVALENT-MAN, 4957
- RADIATION, IONIZING
    - AIR POLLUTANTS, RADIOACTIVE, 4818
    - RADIATION DOSAGE, 4818
    - ROENTGEN-EQUIVALENT-MAN, 4957

- NEOPLASMS, EMBRYONAL AND MIXED
  - KIDNEY NEOPLASMS
    - CASE REPORT, 5208
    - NEOPLASM METASTASIS, 5208
  - OVARIAN NEOPLASMS
    - RADIATION, IONIZING, 4965

- NEOPLASMS, EXPERIMENTAL
  - ASBESTOS
    - FIBER STRUCTURE, 4931*
  - BENZO(A)PYRENE
    - DOSE-RESPONSE STUDY, 4929*
  - CALCIUM SULFATE DIHYDRATE
    - FIBER STRUCTURE, 4931*
  - CARCINOGEN, CHEMICAL
    - ANTIGENIC DETERMINANTS, REVIEW, 4830
  - GLASS
    - FIBER STRUCTURE, 4931*
  - NITROSAMINES
    - TRANSPLANTATION, HOMOLOGOUS, 4898
  - RADIATION, IONIZING
    - INCIDENCE RATES, 4973*
  - SARCOMA, RETICULUM CELL
    - INCIDENCE RATES, 4973*
  - TALC
    - FIBER STRUCTURE, 4931*

- NEOPLASMS, MULTIPLE PRIMARY
  - BLADDER NEOPLASMS
    - REVIEW, 4849
  - BRAIN NEOPLASMS
    - DISGERMINOMA, 5182
  - BREAST NEOPLASMS
    - EPIDEMIOLOGY, REVIEW, 4851
  - COLONIC NEOPLASMS
    - EPIDEMIOLOGY, REVIEW, 5195
  - GENETICS
    - EPIDEMIOLOGY, REVIEW, 4840
  - HAMARTOMA
    - CASE REPORT, 5252*
    - GENETICS, 5252*
  - HEMANGIOMA
    - CASE REPORT, 5252*
  - HODGKIN'S DISEASE
    - EPIDEMIOLOGY, ITALY, 5290
    - HISTOLOGICAL STUDY, 5290
  - LIPOMA
    - CASE REPORT, 5252*
  - SEBACEOUS GLAND NEOPLASMS
    - EPIDEMIOLOGY, DOG, 5325*

- EOPLASMS, MUSCLE TISSUE
  - SARCOMA
    - IRON, 4925, 4926

- EOPLASMS, RADIATION-INDUCED
  - NEUTRONS
    - HISTOLOGICAL STUDY, MOUSE, 4972*
    - INCIDENCE RATES, 4972*

- EOPLASMS, VASCULAR TISSUE
  - HEMANGIOENDOTHELIOMA
    - EPIDEMIOLOGY, HAMSTER, 5277
  - SARCOMA
    - CASE REPORT, 4971
    - POLYETHYLENE TEREPHTHALATE, 4971
    - PROSTHESIS, 4971

- NEOPLASTIC ENDOCRINE-LIKE SYNDROMES
  - THYROID NEOPLASMS
    - CHROMOSOMES, HUMAN, 6-12, 5232*

- NEPHROBLASTOMA
  - CHROMOSOME ABERRATIONS
    - REVIEW, 4873*
  - HODGKIN'S DISEASE
    - REVIEW, 4873*
  - KIDNEY NEOPLASMS
    - UREA, ETHYL NITROSO-, 4893

- NERVOUS SYSTEM
  - NEOPLASMS
    - ABNORMALITIES, 5313*

- NERVOUS SYSTEM NEOPLASMS
  - AGE FACTORS
    - EPIDEMIOLOGY, 5318*
  - HEPATOMA
    - DNA, 5372*
    - DNA-RNA HYBRIDIZATION, 5372*
    - RNA, 5372*
  - INCIDENCE RATES
    - REGISTRY DATA ANALYSIS, 5318*
  - VIRUS, SV40
    - TERATOGENS, 5013
    - TRANSPLACENTAL CARCINOGENESIS, RAT, 5013

- NEURILEMMOMA
  - ADENOSINE CYCLIC 3',5' MONOPHOSPHATE
    - METABOLISM, 5386*
  - ANTIGEN DETERMINANTS
    - ANTI-ANTIBODIES, 5131*
  - CORTICOTROPIN
    - ADENOSINE CYCLIC 3',5' MONOPHOSPHATE, 5386*
    - SURFACE PROPERTIES, 5386*
  - IMMUNE SERUMS
    - ANTIBODY SPECIFICITY, 5131*
  - ISOPROTERENOL
    - SURFACE PROPERTIES, 5386*
  - PROSTAGLANDINS E
    - ADENOSINE CYCLIC 3',5' MONOPHOSPHATE, 5386*
    - SURFACE PROPERTIES, 5386*
  - THORACIC NEOPLASMS
    - CASE REPORT, 5240*
    - VAGUS NERVE, 5240*

- NEUROBLASTOMA
  - ACTINOMYCIN D
    - ADENOSINE CYCLIC 3',5' MONOPHOSPHATE, 5392*
  - ADENOSINE CYCLIC 3',5' MONOPHOSPHATE
    - CARRIER PROTEINS, 5392*
  - CELL DIFFERENTIATION
    - ADENOSINE CYCLIC 3',5' MONOPHOSPHATE, 5392*
  - CHROMATIN
    - CELL DIFFERENTIATION, 5368*
    - NUCLEOPROTEINS, 5368*
  - CYCLOHEXIMIDE
    - ADENOSINE CYCLIC 3',5' MONOPHOSPHATE, 5392*
  - DIBUTYRYL CYCLIC AMP

    CELL DIFFERENTIATION, 5368*
  NUCLEOPROTEINS
    CELL DIFFERENTIATION, 5368*
  PROSTAGLANDINS E
    ADENOSINE CYCLIC 3',5'
      MONOPHOSPHATE, 5392*
  RADIATION, IONIZING
    CARRIER PROTEINS, 5392*
  URIDINE, 5-BROMO-2'-DEOXY-
    ADENOSINE CYCLIC 3',5'
      MONOPHOSPHATE, 5392*

NEURONS
  VIRUS, HERPES SIMPLEX
    VIRUS REPLICATION, 4867*

NEUTRONS
  LYMPHOSARCOMA
    HISTOLOGICAL STUDY, MOUSE, 4972*
    INCIDENCE RATES, 4973*
  NEOPLASMS, RADIATION-INDUCED
    HISTOLOGICAL STUDY, MOUSE, 4972*
    INCIDENCE RATES, 4972*
  SARCOMA, RETICULUM CELL
    HISTOLOGICAL STUDY, MOUSE, 4972*
    INCIDENCE RATES, 4973*

NEUTROPHILS
  BLOOD PLATELET DISORDERS
    STATISTICAL ANALYSIS, 5340
  LEUKEMIA, MYELOCYTIC
    PYROANTIMONATE BINDING, 5256*
    STATISTICAL ANALYSIS, 5340
    ULTRASTRUCTURAL STUDY, 5256*
    ULTRASTRUCTURAL STUDY, ACID
      MUCOSUBSTANCE, 5258*
  LEUKOCYTOSIS
    STATISTICAL ANALYSIS, 5340
  MYELOFIBROSIS
    STATISTICAL ANALYSIS, 5340

NEVUS, PIGMENTED
  ALANINE, 3-(3,4-DIHYDROXYPHENYL)-
    FLUORESCENCE, 5156
  HYDROCHLORIC ACID
    FLUORESCENCE, 5156

NICKEL SULFIDE
  SARCOMA
    DOSE-RESPONSE STUDY, POWDERS, 4927
    STRUCTURE-ACTIVITY RELATIONSHIP,
      4927

NITRIC ACID, SODIUM SALT
  PYRROLIDINE, 1-NITROSO-
    FOOD CONTAMINATION, 4953*

NITROSAMINES
  MICROSOMES, LIVER
    ALKYLATION, 4895
  NEOPLASMS, EXPERIMENTAL
    TRANSPLANTATION, HOMOLOGOUS, 4898
  PHENOL, 3,4-DICHLOROTHIO-
    SPECTROMETRIC STUDY, 4895

NORNICOTINE
  NICOTINE
    GASTRIC JUICE, 4902
  SMOKING
    GASTRIC JUICE, 4902

NUCLEIC ACID HYBRIDIZATION
  BREAST NEOPLASMS
    VIRUS, B-TYPE RNA TUMOR, 4820

NUCLEIC ACIDS
  ASBESTOSIS
    HISTOPATHOLOGICAL STUDY, GUINEA
      PIG, 4884
  CYTOSINE
    CARCINOGENIC ACTIVITY, 4815
    MUTAGENIC ACTIVITY, 4815
    REVIEW, 4815
  PROTEINS
    CROSS-LINKING, REVIEW, 4815
  PYRIMIDINES
    REVIEW, 4816
  RADIATION, IONIZING
    REVIEW, 4816, 4819
  ULTRAVIOLET RAYS
    CARCINOGENIC ACTIVITY, REVIEW,
      4864*
    CROSS-LINKING, REVIEW, 4815
    REVIEW, 4816, 4819

NUCLEOPROTEINS
  HELA CELLS
    VIRUS, ADENO 2, 5081*
  HEPATOMA
    DIETHYLAMINE, N-NITROSO-, 4897
  NEUROBLASTOMA
    CELL DIFFERENTIATION, 5368*
    CHROMATIN, 5368*
  VIRUS, ADENO 1
    DNA, SINGLE-STRANDED, 5080*
    DNA, VIRAL, 5080*
    VIRUS REPLICATION, 5080*
  VIRUS, SV15
    DNA, SINGLE-STRANDED, 5080*
    DNA, VIRAL, 5080*
    VIRUS REPLICATION, 5080*

NUCLEOSIDE DEAMINASES
  CHORIOCARCINOMA
    CELL FUSION, 5364*
    HYBRID CELLS, 5364*

NUCLEOTIDES, CYCLIC
  PSORIASIS
    CELL DIFFERENTIATION, REVIEW,
      4871*

NUCLEOTIDYLTRANSFERASES
  ANTINEOPLASTIC AGENTS
    EMBRYO, MOUSE, 5034

OCCUPATIONAL HAZARD
  ANGIOSARCOMA
    ETHYLENE, CHLORO POLYMER, 5284
  ARSENIC
    REVIEW, 4813
  BLADDER NEOPLASMS
    EPIDEMIOLOGY, 5282
    REVIEW, 4849
    TARS, 5283
  CADMIUM
    LUNG VOLUME MEASUREMENTS, 4942*
  ETHYLENE, CHLORO-

    - CONTROL TECHNOLOGY, 4860*
  - GASTROINTESTINAL NEOPLASMS
    - ASBESTOS, 4930*, 5286
  - LEUKOPENIA
    - ETHYLENE, CHLORO-, 5191
  - LIVER NEOPLASMS
    - EPIDEMIOLOGY, UNITED STATES, 5304*
    - ETHYLENE, CHLORO-, 5191, 5192
  - NEOPLASMS
    - EPIDEMIOLOGY, UTAH, 5330*
    - EPIDEMIOLOGY, WEST GERMANY, 5288
    - RISK ASSESSMENT, METHODOLOGY, 5289
  - PERITONEAL NEOPLASMS
    - MESOTHELIOMA, 5285
  - PLEURAL NEOPLASMS
    - ASBESTOS, 5286
    - MESOTHELIOMA, 5285
  - PULMONARY FIBROSIS
    - CADMIUM, 4942*
  - RESPIRATORY TRACT NEOPLASMS
    - ASBESTOS, 4930*, 5286
  - UROGENITAL NEOPLASMS
    - TARS, 5283

- OLIGODENDROGLIOMA
  - CHOLESTEROL
    - ULTRASTRUCTURAL STUDY, 5184

- ONCOGENIC VIRUSES
  - ARTHROPODS
    - VIRUS TRANSMISSION, REVIEW, 4868*

- OPIUM
  - ESOPHAGEAL NEOPLASMS
    - EPIDEMIOLOGY, IRAN, 5315*

- ORBITAL NEOPLASMS
  - LYMPHOMA
    - REVIEW, 5152
  - PLASMACYTOMA
    - REVIEW, 5152

- OUABAIN
  - PROTEINS
    - FIBROBLASTS, HUMAN, 5400*

- OVARIAN NEOPLASMS
  - ADENOMA
    - RADIATION, IONIZING, 4965
  - ATAXIA TELANGIECTASIA
    - EPIDEMIOLOGY, 5317*
    - GENETICS, 5317*
  - CARBAMIC ACID, ETHYL ESTER
    - AGE FACTORS, MOUSE, 4941*
    - TRANSPLACENTAL CARCINOGENESIS, MOUSE, 4941*
  - CARCINOMA
    - CELL CYCLE KINETICS, 5170
    - DNA, NEOPLASM, 5170
    - KARYOTYPING, 5170
  - CARCINOMA, MUCINOUS
    - ULTRASTRUCTURAL STUDY, 5214*
  - CORTISOL
    - IMMUNE RESPONSE, 5110
    - NEOPLASM TRANSPLANTATION, 5110
  - CYSTADENOMA, MUCINOUS
    - ULTRASTRUCTURAL STUDY, 5214*
  - CYSTADENOMA, PAPILLARY
    - CASE REPORT, TWINS, 5169
  - GRANULOSA CELL TUMOR
    - RADIATION, IONIZING, 4965
  - GYNANDROBLASTOMA
    - CASE REPORT, 5215*
  - MYCOPLASMA INFECTIONS
    - PRECANCEROUS CONDITIONS, 5176
  - NEOPLASMS, EMBRYONAL AND MIXED
    - RADIATION, IONIZING, 4965
  - RADIATION, IONIZING
    - IMMUNE RESPONSE, 5110
    - NEOPLASM TRANSPLANTATION, 5110
  - THECA CELL TUMOR
    - RADIATION, IONIZING, 4965

- OVIPOSITION
  - BLADDER NEOPLASMS
    - SCHISTOSOMIASIS, 5236*
  - URETERAL NEOPLASMS
    - SCHISTOSOMIASIS, 5236*

- OXIDOREDUCTASES, N-DEMETHYLATING
  - CHOLANTHRENE, 3-METHYL-
    - MICROSOMES, LIVER, RAT, 4899

- PANCREATIC NEOPLASMS
  - APPENDECTOMY
    - RISK FACTORS, 5306*
  - CARCINOMA
    - EPIDEMIOLOGY, 5306*
  - DIABETES MELLITUS
    - RISK FACTORS, 5306*
  - GENETICS
    - RISK FACTORS, 5306*
  - HEMORRHAGE, GASTROINTESTINAL
    - EPIDEMIOLOGY, 5238*
  - NEOPLASM METASTASIS
    - EPIDEMIOLOGY, 5238*
  - PULMONARY EMBOLISM
    - EPIDEMIOLOGY, 5238*
  - ULCER
    - RISK FACTORS, 5306*

- PAPAIN
  - BREAST NEOPLASMS
    - ROSETTE FORMATION, 5139*
  - SARCOMA, MAST CELL
    - HISTOCOMPATIBILITY ANTIGENS, 5092
    - IMMUNE RESPONSE, 5092
    - IMMUNE SERUMS, 5092

- PAPILLOMA
  - BLADDER NEOPLASMS
    - SCHISTOSOMIASIS, 5236*
  - STERIGMATOCYSTIN
    - CARCINOGENIC ACTIVITY, RAT, 4802

- PARAGANGLIOMA, NONCHROMAFFIN
  - CELLULAR INCLUSIONS
    - ULTRASTRUCTURAL STUDY, 5248*
  - HEAD AND NECK NEOPLASMS
    - CASE REPORT, 5248*

- PARASITES
  - IMMUNOSUPPRESSION
    - REVIEW, 4835

- PARATHYROID NEOPLASMS
  - HYPERPARATHYROIDISM
    - RADIATION, IONIZING, 4983*

PARITY
- CERVIX NEOPLASMS
  - EPIDEMIOLOGY, EAST GERMANY, 5271
- GYNECOLOGIC NEOPLASMS
  - EPIDEMIOLOGY, AZERBAIJAN SSR, 5273

PAROTID NEOPLASMS
- CARCINOMA
  - RADIATION, IONIZING, 5220*
- RADIATION, IONIZING
  - CASE REPORT, 5220*
- RADIOACTIVE FALLOUT
  - EPIDEMIOLOGY, JAPAN, 5327*
- THORIUM DIOXIDE
  - CASE REPORT, BILATERAL TUMOR, 5218*

PEPTIC ULCER
- LACTATE DEHYDROGENASE
  - ISOENZYMES, 5229*
- STOMACH NEOPLASMS
  - CASE REPORT, 5203
  - PRECANCEROUS CONDITIONS, 5203

PEPTIDE HYDROLASES
- BENZOIC ACID, GUANIDINONITROPHENYL-
  - VIRUS, MURINE SARCOMA, 5007
- CELL DIFFERENTIATION
  - REVIEW, 4857
- CELL TRANSFORMATION, NEOPLASTIC
  - REVIEW, 4857
- NEOPLASM METASTASIS
  - REVIEW, 4857
- VIRUS, MURINE SARCOMA
  - CELL TRANSFORMATION, NEOPLASTIC, 5007
- VIRUS, ROUS SARCOMA
  - ACTINOMYCIN, 4991
  - CYCLOHEXIMIDE, 4991
  - TEMPERATURE SENSITIVE MUTANTS, 4991
  - TUBERCIDIN, 5-BROMO-, 4991

PEPTIDES
- HELA CELLS
  - VIRUS, ADENO 2, 5084*
- VIRUS, ADENO 2
  - CELL MEMBRANE, 5084*
  - ISOLATION AND CHARACTERIZATION, 5084*
- VIRUS, MOLONEY MURINE SARCOMA
  - CELL TRANSFORMATION, NEOPLASTIC, 5059*
  - ISOLATION AND CHARACTERIZATION, 5059*

PERITONEAL CAVITY
- LYMPHOCYTES
  - ULTRASTRUCTURAL STUDY, MOUSE, 5210
- MACROPHAGES
  - ULTRASTRUCTURAL STUDY, MOUSE, 5210
- MAST CELLS
  - ULTRASTRUCTURAL STUDY, MOUSE, 5210

PERITONEAL NEOPLASMS
- LEIOMYOMA
  - CASE REPORT, 5213*
  - HISTOLOGICAL STUDY, 5213*
  - PREGNANCY, 5213*
- LEIOMYOSARCOMA
  - PREGNANCY, 5213*
- MESOTHELIOMA
  - ASBESTOS, 5285
  - EPIDEMIOLOGY, 5285
  - OCCUPATIONAL HAZARD, 5285
- VIRUS, ADENO 12
  - HISTOCHEMICAL STUDY, HAMSTER, 5083*
  - ULTRASTRUCTURAL STUDY, HAMSTER, 5083*

PEROXIDASES
- ESTRADIOL
  - ISOLATION AND CHARACTERIZATION, 5360
  - UTERUS, RAT, 5360
- MAMMARY NEOPLASMS, EXPERIMENTAL
  - BENZ(A)ANTHRACENE, 7,12-DIMETHYL-, 5360
  - ISOLATION AND CHARACTERIZATION, 5360

PHENANTHRENE
- AIR POLLUTANTS
  - AUTOMOBILE EXHAUST, 5287

PHENOL, 3,4-DICHLOROTHIO-
- NITROSAMINES
  - SPECTROMETRIC STUDY, 4895

PHENOTHIAZINE, 2-CHLORO-10-(3-(DIMETHYLAMINO)PROPYL)-
- MAMMARY NEOPLASMS, EXPERIMENTAL
  - PROLACTIN, 4943*

PHEOCHROMOCYTOMA
- ADRENAL GLAND NEOPLASMS
  - THYROID NEOPLASMS, 5160
- ENDOCRINE GLAND NEOPLASMS
  - EPIDEMIOLOGY, HAMSTER, 5276
- THYROID NEOPLASMS
  - PRECANCEROUS CONDITIONS, 5160

PHORBOL 12,13-DIDECANOATE
- BENZ(A)ANTHRACENE, 7,12-DIMETHYL-
  - CELL TRANSFORMATION, NEOPLASTIC, 4904
- CHOLANTHRENE, 3-METHYL-
  - CELL TRANSFORMATION, NEOPLASTIC, 4904

PHORBOL MYRISTATE ACETATE
- SEE 12-O-TETRADECANOYLPHORBOL-13-ACETATE

PHOSPHATE
- L CELLS
  - ANTI-ANTIBODIES, 5132*
  - METABOLISM, 5132*

PHOSPHATES
- ASBESTOSIS
  - HISTOPATHOLOGICAL STUDY, GUINEA PIG, 4884
- CARCINOMA, EHRLICH TUMOR
  - RNA, MESSENGER, 5335
  - RNA, NEOPLASM, 5335
  - RNA, RIBOSOMAL, 5335

HOSPHODIESTERASES
    LEUKEMIA L1210
        KINETIC STUDY, 5389*
    LEUKEMIA, LYMPHOCYTIC
        KINETIC STUDY, 5389*
    MELANOMA
        ISOLATION AND CHARACTERIZATION, 5374*
        KINETIC STUDY, 5374*

HOSPHOLIPIDS
    L CELLS
        ANTI-ANTIBODIES, 5132*

HOSPHOTRANSFERASES
    VIRUS, FRIEND MURINE LEUKEMIA
        SPLEEN, 5047*
        VIRUS REPLICATION, 5047*
    VIRUS, RAUSCHER MURINE LEUKEMIA
        SPLEEN, 5047*
        VIRUS REPLICATION, 5047*

HYTOHEMAGGLUTININ
    SEE PLANT AGGLUTININS

INEALOMA
    BRAIN NEOPLASMS
        CASE REPORT, 5182
        HISTOLOGICAL STUDY, 5182
    VIRUS, PAPOVA
        ULTRASTRUCTURAL STUDY, 5078*

ITUITARY HORMONES
    PITUITARY NEOPLASMS
        ADENOMA, 5161, 5162
        ULTRASTRUCTURAL STUDY, 5162
        ULTRASTRUCTURAL STUDY, RAT, 5161

ITUITARY NEOPLASMS
    ADENOMA
        AGE FACTORS, 5161
        CASE REPORT, 5168
        DIAGNOSIS AND PROGNOSIS, 5163
        HISTOLOGICAL STUDY, 5163
        PITUITARY HORMONES, 5161, 5162
        TRIETHYLAMINE, 2-(P-(2-CHLORO-1,2-DIPHENYLVINYL)PHENOXY)-, CITRAT, 5168
        ULTRASTRUCTURAL STUDY, 5162
        ULTRASTRUCTURAL STUDY, RAT, 5161
    ADENOMA, CHROMOPHOBE
        ADENOMATOSIS, FAMILIAL ENDOCRINE, 5216*
        GENETICS, 5216*
    AGE FACTORS
        ULTRASTRUCTURAL STUDY, RAT, 5161
    BREAST NEOPLASMS
        CASE REPORT, 5216*
    DIAGNOSIS AND PROGNOSIS
        CASE REPORT, 5162
    HISTOLOGICAL STUDY
        DIAGNOSIS AND PROGNOSIS, 5163
    PITUITARY HORMONES
        ULTRASTRUCTURAL STUDY, 5162
        ULTRASTRUCTURAL STUDY, RAT, 5161
    PRECANCEROUS CONDITIONS
        ULTRASTRUCTURAL STUDY, RAT, 5161
    PREGNANCY
        CASE REPORT, 5168
    TRIETHYLAMINE, 2-(P-(2-CHLORO-1,2-DIPHENYLVINYL)PHENOXY)-, CITRAT
        CASE REPORT, 5168
    ULTRASTRUCTURAL STUDY
        CASE REPORT, 5162
        DIAGNOSIS AND PROGNOSIS, 5162

PLACENTAL EXTRACTS
    ERYTHROLEUKEMIA
        CELL DIFFERENTIATION, 4998
        HEMOGLOBINS, 4998

PLANT AGGLUTININS
    CELL MEMBRANE
        AGGLUTINATION, 5338
        BINDING, 5338
    HEPATOMA
        FETAL GLOBULINS, 5103
    HODGKIN'S DISEASE
        EPIDEMIOLOGY, 5300*
        LYMPHOCYTE TRANSFORMATION, 5299*
    LYMPHOSARCOMA
        CELL MEMBRANE, 5261*
    SARCOMA, RETICULUM CELL
        CELL MEMBRANE, 5261*
    VIRUS, HERPES SAIMIRI
        IMMUNE SERUMS, 5016
        LYMPHOCYTE TRANSFORMATION, 5015
    VIRUS, RNA TUMOR
        BINDING SITES, 5035*

PLANT TUMORS
    AGROBACTERIUM TUMEFACIENS
        EXTRACHROMOSOMAL INHERITANCE, 4881
        GUANIDINES, 4881
        ULTRASTRUCTURAL STUDY, 5266*
    CHROMOSOME ABERRATIONS
        CELL NUCLEUS, 4950*
    DNA, NEOPLASM
        CELL NUCLEUS, 4950*
    KARYOTYPING
        CELL NUCLEUS, 4950*

PLASMA CELLS
    STOMACH NEOPLASMS
        NEOPLASM METASTASIS, 5205

PLASMACYTOMA
    EYE NEOPLASMS
        REVIEW, 5152
    HYBRID CELLS
        IMMUNOGLOBULINS, LIGHT CHAIN, 5099
    IMMUNOGLOBULINS, LIGHT CHAIN
        AZAGUANINE RESISTANCE, 5099
        RNA, MESSENGER, 5099
    METHANESULFONIC ACID, THIO-, S-METHYL ESTER
        CELL DIVISION, 5336
    ORBITAL NEOPLASMS
        REVIEW, 5152
    SULFHYDRYL COMPOUNDS
        CELL DIVISION, 5336

PLASMINOGEN
    EMBRYO
        CELL CYCLE KINETICS, 5394*
        CELL TRANSFORMATION, NEOPLASTIC, 5394*
    VIRUS, ROUS SARCOMA

- CELL TRANSFORMATION, NEOPLASTIC, 5038*
- INTRACELLULAR DISTRIBUTION, 5038*
- VIRUS, SV40
  - AGGLUTINATION, 5069*
  - CELL TRANSFORMATION, NEOPLASTIC, 5038*, 5069*
  - CONCANAVALIN A, 5069*

PLATELET AGGREGATION
- LEUKEMIA, MYELOCYTIC
  - ULTRASTRUCTURAL STUDY, 5253*

PLEURAL NEOPLASMS
- ASBESTOS
  - OCCUPATIONAL HAZARD, 5286
- MESOTHELIOMA
  - ASBESTOS, 5285, 5286
  - EPIDEMIOLOGY, 5285
  - OCCUPATIONAL HAZARD, 5285

PLUTONIUM
- LUNG NEOPLASMS
  - ANTIGENIC DETERMINANTS, 4980*
- RADIATION INJURIES, EXPERIMENTAL
  - DOSE-RESPONSE STUDY, 4960
  - METABOLISM, MOUSE, 4960
- SARCOMA, OSTEOGENIC
  - ANTIGENIC DETERMINANTS, 4980*
  - HISTOLOGICAL STUDY, 4980*
  - IMMUNE RESPONSE, 4980*
  - LYMPHOCYTE CYTOTOXICITY, 4980*

PNEUMOCONIOSIS
- RADON
  - HISTOPATHOLOGICAL STUDY, RAT, 4974*
  - PROLINE, 4-HYDROXY-, 4974*
- URANIUM
  - HISTOPATHOLOGICAL STUDY, RAT, 4974*
  - PROLINE, 4-HYDROXY-, 4974*

PNEUMONIA
- VIRUS, HERPES SIMPLEX
  - VIRUS REPLICATION, 4867*

PNEUMOPERITONEUM
- CELL TRANSFORMATION, NEOPLASTIC
  - FLUOROSCOPY, 4981*

PNEUMOTHORAX
- CELL TRANSFORMATION, NEOPLASTIC
  - FLUOROSCOPY, 4981*

POLONIUM
- ARYL HYDROCARBON HYDROXYLASES
  - LIVER, MOUSE, 4937*
- CHOLANTHRENE, 3-METHYL-
  - ARYL HYDROCARBON HYDROXYLASES, 4937*

POLY C
- RNA POLYMERASE
  - SPLEEN, MOUSE, 5044*
- SULFHYDRYL COMPOUNDS
  - RNA POLYMERASE, 5044*
- VIRUS, FRIEND MURINE LEUKEMIA
  - RNA POLYMERASE, 5044*

POLY U
- CARCINOMA, EHRLICH TUMOR
  - RNA, NEOPLASM, 5335

POLYAMINES
- HEPATOMA
  - CARBOXY-LYASES, 5357
- VIRUS, POLYOMA
  - DNA REPLICATION, 5074*
  - RNA REPLICATION, 5074*

POLYCYCLIC HYDROCARBONS
- AIR POLLUTANTS
  - AUTOMOBILE EXHAUST, 5287
- BRONCHI
  - BINDING, 5225*
- FREE RADICALS
  - ULTRAVIOLET RAYS, 4901

POLYCYTHEMIA VERA
- ADENOSINE CYCLIC 3',5' MONOPHOSPHATE
  - DIAGNOSIS AND PROGNOSIS, 5352
- LEUKEMIA, MYELOCYTIC
  - STATISTICAL ANALYSIS, 5340

POLYETHYLENE TEREPHTHALATE
- NEOPLASMS, VASCULAR TISSUE
  - SARCOMA, 4971

POLYPS
- COLONIC NEOPLASMS
  - PRECANCEROUS CONDITIONS, REVIEW, 5195
- INTESTINAL NEOPLASMS
  - EPIDEMIOLOGY, 5198
- SIGMOID NEOPLASMS
  - EPIDEMIOLOGY, 5230*
- STOMACH NEOPLASMS
  - EPIDEMIOLOGY, EAST GERMANY, 5267
  - PRECANCEROUS CONDITIONS, 4844

POLYRIBOSOMES
- LIVER NEOPLASMS
  - DIETHYLAMINE, N-NITROSO-, 4896

POLYSACCHARIDES
- VIRUS, C-TYPE RNA TUMOR
  - VIRUS INDUCTION, 4997

PORPHYRIA
- HEPATOMA
  - IMMUNOGLOBULINS, 5104
  - T-LYMPHOCYTES, 5104
- B-LYMPHOCYTES
  - HEMOPEXIN, 5104
  - IMMUNOGLOBULINS, 5104
- T-LYMPHOCYTES
  - HEMOPEXIN, 5104
  - IMMUNOGLOBULINS, 5104

POTASSIUM
- PROTEINS
  - FIBROBLASTS, HUMAN, 5400*

PRECANCEROUS CONDITIONS
- ANEMIA, APLASTIC
  - CASE REPORT, 5154
- BLADDER NEOPLASMS
  - REVIEW, 4849

- BREAST NEOPLASMS
  - EPIDEMIOLOGY, BEAGLE BITCHES, 5275
  - REVIEW, 4852
- BRONCHIAL NEOPLASMS
  - CYTOCHEMICAL STUDY, 5225*
  - ULTRASTRUCTURAL STUDY, 5225*
- CERVIX NEOPLASMS
  - CHROMOSOME ABERRATIONS, 5173, 5174
  - CYTOLOGICAL SCREENING, 5270
  - EPIDEMIOLOGY, 5177
  - EPIDEMIOLOGY, AZERBAIJAN SSR, 5273
  - EPIDEMIOLOGY, DENMARK, 5270
  - EPIDEMIOLOGY, EAST GERMANY, 5271
  - EPIDEMIOLOGY, YOUNG WOMAN, 5172
  - HISTOLOGICAL STUDY, 5177
- COLONIC NEOPLASMS
  - ADENOCARCINOMA, 5199
  - ALKALINE PHOSPHATASE, 5234*
  - ARYLSULFATASES, 5234*
  - CARCINOEMBRYONIC ANTIGEN, 5234*
  - CARCINOMA, 5197
  - EPIDEMIOLOGY, REVIEW, 5269
  - LACTATE DEHYDROGENASE, 5234*
- ENDOCRINE GLAND NEOPLASMS
  - GENETICS, 5160
- GYNECOLOGIC NEOPLASMS
  - ASCORBIC ACID, 5345
  - MALATE DEHYDROGENASE, 5345
  - PYRUVIC ACID, 5345
- INTESTINAL NEOPLASMS
  - ADENOCARCINOMA, 5199
  - CASE REPORT, 5196
- LIVER NEOPLASMS
  - ETHYLENE, CHLORO-, 5191, 5192
- LUNG NEOPLASMS
  - ASBESTOS, 4884
- MOUTH NEOPLASMS
  - EPIDEMIOLOGY, SRI LANKA, 5281
- OVARIAN NEOPLASMS
  - MYCOPLASMA INFECTIONS, 5176
- PITUITARY NEOPLASMS
  - ULTRASTRUCTURAL STUDY, RAT, 5161
- SKIN NEOPLASMS
  - REVIEW, 4847
  - ULTRAVIOLET RAYS, 4817
- STOMACH NEOPLASMS
  - ADENOMA, 4844, 5200
  - EPIDEMIOLOGICAL STUDY, JAPAN, 4844
  - EPIDEMIOLOGY, REVIEW, 5302*
  - GASTRECTOMY, 5233*
  - GUANIDINE, 1-METHYL-3-NITRO-1-NITROSO-, 4921
  - HISTOLOGICAL STUDY, 4844
  - INTESTINAL POLYPS, 5200
  - LACTATE DEHYDROGENASE, 5229*
  - PEPTIC ULCER, 5203
  - POLYPS, 4844
- TESTICULAR NEOPLASMS
  - VIRUS, HERPES SIMPLEX 2, 5022
- THYROID NEOPLASMS
  - PHEOCHROMOCYTOMA, 5160
- UTERINE NEOPLASMS
  - ELASTIC TISSUE, 5171
  - MYCOPLASMA INFECTIONS, 5176
  - REVIEW, 4848
- VAGINAL NEOPLASMS
  - CONTRACEPTIVE DEVICES, FEMALE, 5175
  - 4,4'-STILBENEDIOL, ALPHA,ALPHA'-DIETHYL-, 5175

PREDNISOLONE
- HEPATOMA
  - ANTIBODIES, NEOPLASM, 5133*
  - CYTOTOXICITY TESTS, IMMUNOLOGIC, 5133*

PREGNA-1,4-DIENE-3,11,20-TRIONE, 17,21-DIHYDROXY-
- ERYTHREMIC MYELOSIS
  - IMMUNOSUPPRESSION, 5237*

PREGNANCY
- PERITONEAL NEOPLASMS
  - LEIOMYOMA, 5213*
  - LEIOMYOSARCOMA, 5213*
- PITUITARY NEOPLASMS
  - CASE REPORT, 5168
- 4,4'-STILBENEDIOL, ALPHA,ALPHA'-DIETHYL-
  - LIVER, MOUSE, 4945*
  - METABOLISM, MOUSE, 4945*
- UROGENITAL NEOPLASMS
  - EPIDEMIOLOGY, 5272

PROGESTATIONAL HORMONES
- MUTAGENIC ACTIVITY
  - REVIEW, 4854

PROGESTERONE
- 5ALPHA-ANDROSTAN-3-ONE, 17BETA-HYDROXY-
  - VAGINA, 4886
- MAMMARY NEOPLASMS, EXPERIMENTAL
  - REVIEW, 4854
- MUTAGENIC ACTIVITY
  - REVIEW, 4854

PROLACTIN
- MAMMARY NEOPLASMS, EXPERIMENTAL
  - BENZ(A)ANTHRACENE, 7,12-DIMETHYL-, 4910
  - ESTRUS, 4910
  - PHENOTHIAZINE, 2-CHLORO-10-(3-(DIMETHYL-AMINO)PROPYL)-, 4943*
  - TISSUE CONCENTRATION, RAT, 4943*

PROLINE
- PYRROLIDINE, 1-NITROSO-
  - FOOD CONTAMINATION, 4953*

PROLINE, 4-HYDROXY-
- FIBROBLASTS
  - DNA REPLICATION, 5381*
- PNEUMOCONIOSIS
  - RADON, 4974*
  - URANIUM, 4974*

PROSTAGLANDINS E
- NEURILEMMOMA
  - ADENOSINE CYCLIC 3',5' MONOPHOSPHATE, 5386*
  - SURFACE PROPERTIES, 5386*
- NEUROBLASTOMA
  - ADENOSINE CYCLIC 3',5' MONOPHOSPHATE, 5392*

PROSTATIC NEOPLASMS

    ADENOCARCINOMA
        BLOCKING FACTOR, 5141*
        RADIATION INJURIES, EXPERIMENTAL, 4967
        RADIATION, IONIZING, 4967
    EPITHELIAL CELLS
        ULTRASTRUCTURAL STUDY, 5021
        VIRUS-LIKE PARTICLES, 5021
    IMMUNE SERUMS
        IMMUNITY, CELLULAR, 5141*
    IMMUNITY, CELLULAR
        LEUKOCYTE ADHERENCE INHIBITION, 5141*
    RACIAL FACTORS
        EPIDEMIOLOGY, 5296*
    SOCIOECONOMIC FACTORS
        EPIDEMIOLOGY, 5296*
    VIRUS, HERPES SIMPLEX 2
        CELL TRANSFORMATION, NEOPLASTIC, 5022

PROTEIN KINASE
    HEPATOMA
        ADENOSINE CYCLIC 3',5' MONOPHOSPHATE, 5355
        ISOLATION AND CHARACTERIZATION, 5355
        MITOCHONDRIA, LIVER, 5355

PROTEINS
    DNA REPLICATION
        FIBROBLASTS, HUMAN, 5400*
    HEPATOMA
        AMINO ACIDS, 5347
        ARGININE, 5347
        CANAVANINE, 5347
        CHROMATIN, 5346
        CYCLOHEXIMIDE, 5347
        GROWTH SUBSTANCES, 5347
        INSULIN, 5347
    LYMPHOCYTES
        CELL MOVEMENT, REVIEW, 4831
    MELANOCYTES
        MOUSE, COAT COLOR MUTANT, 5398*
    NUCLEIC ACIDS
        CROSS-LINKING, REVIEW, 4815
    OUABAIN
        FIBROBLASTS, HUMAN, 5400*
    POTASSIUM
        FIBROBLASTS, HUMAN, 5400*
    12-O-TETRADECANOYLPHORBOL-13-ACETATE
        EPIDERMIS, MOUSE, 4936*
    VIRUS, ROUS SARCOMA
        CELL TRANSFORMATION, NEOPLASTIC, 5040*
        TEMPERATURE SENSITIVE MUTANTS, 5040*
    VIRUS, SV40
        CELL TRANSFORMATION, NEOPLASTIC, 5393*

PSORIASIS
    NUCLEOTIDES, CYCLIC
        CELL DIFFERENTIATION, REVIEW, 4871*

PULMONARY ADENOMATOSIS, OVINE
    VIRUS, HERPES
        ANTIBODIES, VIRAL, 5062*
        VIRUS-LIKE PARTICLES, 5062*
        VIRUS REPLICATION, 5062*
    VIRUS-LIKE PARTICLES
        ISOLATION AND CHARACTERIZATION, 5062*
        ULTRASTRUCTURAL STUDY, 5062*

PULMONARY EMBOLISM
    PANCREATIC NEOPLASMS
        EPIDEMIOLOGY, 5238*

PULMONARY FIBROSIS
    CADMIUM
        OCCUPATIONAL HAZARD, 4942*
    CARCINOMA, BRONCHIOLAR
        CASE REPORT, 5188

PURINE, 2-AMINO-
    HYPERBARIC OXYGENATION
        MUTAGENIC ACTIVITY, 4882
    SALMONELLA TYPHIMURIUM
        HYPERBARIC OXYGENATION, 4882

PURINE, 6-((1-METHYL-4-NITROIMIDAZOL-5-YL) THIO)-
    ERYTHREMIC MYELOSIS
        IMMUNOSUPPRESSION, 5237*

PUROMYCIN
    LEUKEMIA, MYELOCYTIC
        INTERFERON, 5109

PUTRESCINE
    PYRROLIDINE, 1-NITROSO-
        FOOD CONTAMINATION, 4953*

PYRENE
    AIR POLLUTANTS
        AUTOMOBILE EXHAUST, 5287

PYRIMIDINES
    NUCLEIC ACIDS
        REVIEW, 4816

PYRROLIDINE, 1-NITROSO-
    NITRIC ACID, SODIUM SALT
        FOOD CONTAMINATION, 4953*
    PROLINE
        FOOD CONTAMINATION, 4953*
    PUTRESCINE
        FOOD CONTAMINATION, 4953*

PYRUVIC ACID
    GYNECOLOGIC NEOPLASMS
        LEIOMYOMA, 5345
        PRECANCEROUS CONDITIONS, 5345

QUINOLINE, 4-NITRO-, 1-OXIDE
    BACILLUS SUBTILIS
        MUTAGENIC ACTIVITY, 4883
        SCREENING METHOD, 4883
    MUTAGENIC ACTIVITY, YEAST
        SCREENING METHOD, 4880
    STOMACH NEOPLASMS
        ADENOCARCINOMA, 4919
        NEOPLASM TRANSPLANTATION, 4919

RADIATION
    CELL SURVIVAL

    - DOSE-RESPONSE STUDY, REVIEW, 4863*
- CHROMOSOME ABERRATIONS
    - ANIMALS, LABORATORY, 4862*
    - GERM CELLS, 4862*
- THYMOMA
    - CELL DIFFERENTIATION, 4979*
- THYMUS
    - CELL CYCLE KINETICS, 4979*
- VIRUS, MURINE LEUKEMIA
    - VIRUS REPLICATION, 4979*

ADIATION GENETICS
- RADIATION EFFECTS
    - ROENTGEN-EQUIVALENT-MAN, 4957
- RADIATION, IONIZING
    - ROENTGEN-EQUIVALENT-MAN, 4957

ADIATION INJURIES
- AIR POLLUTANTS, RADIOACTIVE
    - RADIATION, IONIZING, 4818
- RADIATION, IONIZING
    - EPITHELIAL CELLS, 4970
    - RADIATION DOSAGE, 4818

ADIATION INJURIES, EXPERIMENTAL
- PLUTONIUM
    - DOSE-RESPONSE STUDY, 4960
    - METABOLISM, MOUSE, 4960
- PROSTATIC NEOPLASMS
    - ADENOCARCINOMA, 4967

ADIATION, IONIZING
- AIR POLLUTANTS, RADIOACTIVE
    - RADIATION INJURIES, 4818
- ARTHRITIS
    - RADIOTHERAPY DOSAGE, GONADS, 4969
- BONE MARROW CELLS
    - CELL DIFFERENTIATION, 4964
    - CHROMOSOME ABERRATIONS, 4958
    - HEMATOPOIESIS, 4964
    - B-LYMPHOCYTES, 4964
    - ULTRASTRUCTURAL STUDY, 4964
- BRAIN NEOPLASMS
    - MENINGIOMA, 5221*
- BREAST NEOPLASMS
    - ACNUE, 4976*
    - CARCINOGENIC POTENTIAL, 4976*
    - CASE REPORT, 4976*
    - HIRSUTISM, 4976*
    - PNEUMOTHERAPY, EPIDEMIOLOGY, 4986*
- CELL TRANSFORMATION, NEOPLASTIC
    - DOSE-RESPONSE STUDY, LINEAR ENERGY TRANSFER, 4861*
- CHROMOSOME ABERRATIONS
    - DOSE-RESPONSE STUDY, 4977*
- CYTOPLASM
    - DOSE RESPONSE STUDY, 4966
    - ULTRASTRUCTURAL STUDY, 4966
- DNA
    - REVIEW, 4819
- EPITHELIAL CELLS
    - RADIATION INJURIES, 4970
- HYPERPARATHYROIDISM
    - EPIDEMIOLOGY, 4983*
- KIDNEY
    - TRANSPLANTATION, HOMOLOGOUS, 4984*
- LEUKEMIA
    - CELL DIFFERENTIATION, 4975*
    - EPIDEMIOLOGY, REVIEW, 4877*
    - HYPERSENSITIVITY, DELAYED, 4975*
    - IMMUNE RESPONSE, 4975*
    - THYMECTOMY, 4975*
    - THYMOMA, 4975*
    - TRANSPLACENTAL CARCINOGENESIS, 4876*
- LEUKEMIA, MYELOCYTIC
    - P-CRESOL, 2,6-DI-TERT-BUTYL-, 4954*
- LYMPHOCYTES
    - CHROMOSOME ABERRATIONS, 4977*
- LYMPHOSARCOMA
    - HISTOLOGICAL STUDY, MOUSE, 4972*
    - INCIDENCE RATES, 4973*
- MENINGIOMA
    - CASE REPORT, 5221*
- NEOPLASMS
    - AIR POLLUTANTS, RADIOACTIVE, 4818
    - RADIATION DOSAGE, 4818
    - ROENTGEN-EQUIVALENT-MAN, 4957
- NEOPLASMS, EXPERIMENTAL
    - INCIDENCE RATES, 4973*
- NEUROBLASTOMA
    - CARRIER PROTEINS, 5392*
- NEURONS
    - DOSE RESPONSE STUDY, 4966
    - ULTRASTRUCTURAL STUDY, 4966
- NUCLEIC ACIDS
    - REVIEW, 4816, 4819
- OVARIAN NEOPLASMS
    - ADENOMA, 4965
    - GRANULOSA CELL TUMOR, 4965
    - IMMUNE RESPONSE, 5110
    - NEOPLASM TRANSPLANTATION, 5110
    - NEOPLASMS, EMBRYONAL AND MIXED, 4965
    - THECA CELL TUMOR, 4965
- PARATHYROID NEOPLASMS
    - HYPERPARATHYROIDISM, 4983*
- PAROTID NEOPLASMS
    - CARCINOMA, 5220*
    - CASE REPORT, 5220*
- PROSTATIC NEOPLASMS
    - ADENOCARCINOMA, 4967
- RADIATION GENETICS
    - ROENTGEN-EQUIVALENT-MAN, 4957
- RADIATION INJURIES
    - RADIATION DOSAGE, 4818
- SARCOMA, RETICULUM CELL
    - HISTOLOGICAL STUDY, MOUSE, 4972*
    - INCIDENCE RATES, 4973*
- SKIN NEOPLASMS
    - CARCINOMA, BASAL CELL, 4968
    - CARCINOMA, EPIDERMOID, 4968
    - CASE REPORT, 4968
    - HYPERTRICHOSIS, 4968
    - SIEVE PLATES, 4963
- SPONDYLITIS
    - RADIOTHERAPY DOSAGE, GONADS, 4969
- THYMOMA
    - P-CRESOL, 2,6-DI-TERT-BUTYL-, 4954*
- THYROID NEOPLASMS
    - DIAGNOSIS AND PROGNOSIS, 4821
    - HYPERPARATHYROIDISM, 4983*
    - RADIOTHERAPY, CHILD, 4821
- TRANSPLANTATION, HOMOLOGOUS
    - DOSE-RESPONSE STUDY, 4984*

- RADIATION, NON-IONIZING
  - FIBROSARCOMA
    - VIRUS, HERPES SIMPLEX 2, 5089*
  - VIRUS, HERPES SIMPLEX 2
    - ACRIDINE, 3,6-DIAMINO-, 5089*

- RADIOACTIVE FALLOUT
  - PAROTID NEOPLASMS
    - EPIDEMIOLOGY, JAPAN, 5327*
  - STRONTIUM RADIOISOTOPES
    - DEPOSITION, TOKYO, 5328*
    - WEATHER, JAPAN, 5329*

- RADIOISOTOPES
  - LUNG NEOPLASMS
    - ALPHA PARTICLES, 4866*
  - THORIUM DIOXIDE
    - GASTRIC JUICE, 4961

- RADIUM
  - SARCOMA, OSTEOGENIC
    - A-TYPE PARTICLES, 4962
    - ULTRASTRUCTURAL STUDY, MOUSE, 4962

- RADON
  - PNEUMOCONIOSIS
    - HISTOPATHOLOGICAL STUDY, RAT, 4974*
    - PROLINE, 4-HYDROXY-, 4974*

- RECEPTORS, HORMONE
  - ESTROGENS
    - ISOLATION AND CHARACTERIZATION, REVIEW, 5361
  - 4,4'-STILBENEDIOL, ALPHA,ALPHA'-DIETHYL-
    - MULLERIAN DUCTS, 4944*

- RECTAL NEOPLASMS
  - ADENOCARCINOMA
    - HYDRAZINE, 1,2-DIMETHYL-, DIHYDROCHLORIDE, 4915
  - ADENOMA
    - HYDRAZINE, 1,2-DIMETHYL-, DIHYDROCHLORIDE, 4915
  - CARCINOGEN, CHEMICAL
    - ANTIGENS, NEOPLASM, 4830
    - IMMUNE RESPONSE, REVIEW, 4830
  - COLONIC NEOPLASMS
    - EPIDEMIOLOGY, REVIEW, 5269
  - HYDRAZINE, 1,2-DIMETHYL-, DIHYDROCHLORIDE
    - CARCINOGENIC ACTIVITY, MOUSE, 4915
    - ULTRASTRUCTURAL STUDY, 4915
  - SEX FACTORS
    - EPIDEMIOLOGY, 4841
  - SOCIOECONOMIC FACTORS
    - DIAGNOSIS AND PROGNOSIS, 5295*

- RESERPINE
  - BREAST NEOPLASMS
    - EPIDEMIOLOGY, 5274
    - HYPERTENSION, 5274

- RESPIRATION
  - HEPATOMA
    - CELL DIFFERENTIATION, 5334

- RESPIRATORY TRACT
  - CERIUM RADIOISOTOPES
    - DOSE-RESPONSE STUDY, 4978*
    - HISTOLOGICAL STUDY, BEAGLE, 4978*

- RESPIRATORY TRACT NEOPLASMS
  - ASBESTOS
    - EPIDEMIOLOGY, 4930*
    - OCCUPATIONAL HAZARD, 4930*, 5286
  - EPIDEMIOLOGY
    - UTAH, 5293*
  - MESOTHELIOMA
    - ASBESTOS, 4930*

- RETICULOSARCOMA
  - SEE SARCOMA, RETICULUM CELL

- RETINOBLASTOMA
  - ADULT
    - CASE REPORT, 5242*
    - HISTOLOGICAL STUDY, 5242*
  - CELL DIFFERENTIATION
    - FLEXNER-WINTERSTEINER ROSETTES, 5241*
    - HISTOLOGICAL STUDY, 5241*
  - CHROMOSOME ABERRATIONS
    - REVIEW, 4873*
  - EYE NEOPLASMS
    - VIRUS, ADENO 12, 5024
  - GENETICS
    - AGE FACTORS, 5243*
    - PENETRANCE ANALYSIS, 5243*
  - VIRUS, ADENO 12
    - ANTIGENS, VIRAL, 5024
    - ULTRASTRUCTURAL STUDY, RAT, 5024

- RETINOL
  - ETHANE, 1,1,1-TRICHLORO-2,2-BIS(P-CHLOROPHENYL)-
    - CYTOCHROME P-450, 4890
    - DOSE RESPONSE STUDY, 4890
    - METABOLISM, PIG, 4885

- RETRORSINE-N-OXIDE
  - HEPATOMA
    - CARCINOGENIC ACTIVITY, RAT, 4810
    - ISOLATION AND CHARACTERIZATION, 4810

- REVERSE TRANSCRIPTASE
  - ANTINEOPLASTIC AGENTS
    - VIRUS, AVIAN MYELOBLASTOSIS, 5034
    - VIRUS, SIMIAN SARCOMA, 5034
  - GLOBIN
    - DNA REPLICATION, 5351
  - HODGKIN'S DISEASE
    - DIAGNOSIS AND PROGNOSIS, 5352
  - LEUKEMIA, LYMPHOCYTIC
    - DIAGNOSIS AND PROGNOSIS, 5352
  - LEUKEMIA, MYELOBLASTIC
    - DIAGNOSIS AND PROGNOSIS, 5352
  - LEUKEMIA, MYELOCYTIC
    - DIAGNOSIS AND PROGNOSIS, 5352
    - VIRUS, GIBBON APE LEUKEMIA, 4865*
    - VIRUS, RNA TUMOR, 4865*
    - VIRUS, WOOLLY MONKEY SARCOMA, 4865*
  - SARCOMA
    - VIRUS, ROUS SARCOMA, 4993
  - VIRUS, B77

    - TEMPERATURE SENSITIVE MUTANTS, 4996
  - VIRUS, C-TYPE RNA TUMOR
    - ANTIGENS, VIRAL, 5011
  - VIRUS, FRIEND MURINE LEUKEMIA
    - DIAGNOSIS AND PROGNOSIS, 5352
  - VIRUS-LIKE PARTICLES
    - ANTIGENS, VIRAL, 5011
  - VIRUS, RAUSCHER MURINE LEUKEMIA
    - DNA NUCLEOTIDYLTRANSFERASES, 4996
    - TEMPERATURE SENSITIVE MUTANTS, 4996
  - VIRUS, RD-114
    - ANTIGENS, VIRAL, 5011
  - VIRUS, ROUS SARCOMA
    - MITOCHONDRIA, 4993
    - TEMPERATURE SENSITIVE MUTANTS, 4996
  - VIRUS, SIMIAN SARCOMA
    - ANTIGENS, VIRAL, 5011

- RHABDOMYOMA
  - HEART NEOPLASMS
    - ULTRASTRUCTURAL STUDY, 5246*

- RIBONUCLEOTIDES
  - MORPHOLINE, 4-NITROSO-
    - LVIER, RAT, 4917

- RIFAMPICIN
  - VIRUS, MYCOPLASMA
    - ACHOLEPLASMA LAIDLAWII, 5029
    - DNA REPLICATION, 5029
    - VIRUS REPLICATION, 5029

- RNA
  - ACETAMIDE
    - CELL NUCLEUS, 4889
    - CELL TRANSFORMATION, NEOPLASTIC, 4889
  - ACETAMIDE, THIO-
    - CELL NUCLEUS, 4889
    - CELL TRANSFORMATION, NEOPLASTIC, 4889
  - NERVOUS SYSTEM NEOPLASMS
    - HEPATOMA, 5372*

- RNA, MESSENGER
  - CARCINOMA, EHRLICH TUMOR
    - PHOSPHATES, 5335
  - ERYTHROLEUKEMIA
    - HEMIN, 5350
    - METHANE, SULFINYLBIS-, 5349, 5350
    - RNA-DNA HYBRIDIZATION, 5349
  - HEPATOMA
    - DIETHYLAMINE, N-NITROSO-, 4897
  - MULTIPLE MYELOMA
    - IMMUNOGLOBULINS, 5144*
  - MYELOMA PROTEINS
    - IMMUNOGLOBULIN FRAGMENTS, 5100
  - PLASMACYTOMA
    - IMMUNOGLOBULINS, LIGHT CHAIN, 5099
  - VIRUS, ADENO 2
    - ISOLATION AND CHARACTERIZATION, 5023
    - REVIEW, 4823
  - VIRUS, ADENO 5
    - VIRUS REPLICATION, 5085*
  - VIRUS, POLYOMA
    - ISOLATION AND IDENTIFICATION, 5075*
    - VIRUS REPLICATION, 5075*

- RNA, NEOPLASM
  - CARCINOMA, EHRLICH TUMOR
    - ISOLATION AND CHARACTERIZATION, 5335
    - PHOSPHATES, 5335
    - POLY U, 5335
  - HEPATOMA
    - DIETHYLAMINE, N-NITROSO-, 4897

- RNA POLYMERASE
  - ANTINEOPLASTIC AGENTS
    - EMBRYO, MOUSE, 5034
  - HELA CELLS
    - VIRUS, ADENO 2, 5081*
  - HODGKIN'S DISEASE
    - DIAGNOSIS AND PROGNOSIS, 5352
  - LEUKEMIA, LYMPHOCYTIC
    - DIAGNOSIS AND PROGNOSIS, 5352
  - LEUKEMIA, MYELOBLASTIC
    - DIAGNOSIS AND PROGNOSIS, 5352
  - LEUKEMIA, MYELOCYTIC
    - DIAGNOSIS AND PROGNOSIS, 5352
  - POLY C
    - SPLEEN, MOUSE, 5044*
    - SULFHYDRYL COMPOUNDS, 5044*
  - RNA, TRANSFER, METHYLTRANSFERASES
    - DIAGNOSIS AND PROGNOSIS, 5352
  - VIRUS, FRIEND MURINE LEUKEMIA
    - DIAGNOSIS AND PROGNOSIS, 5352
    - POLY C, 5044*

- RNA REPLICATION
  - CARCINOMA, EHRLICH TUMOR
    - CHALONES, 5397*
  - VIRUS, ADENO 2
    - DNA REPLICATION, 5023
    - DNA-RNA HYBRIDIZATION, 5023
  - VIRUS, POLYOMA
    - ACTINOMYCIN D, 5074*
    - CARBOXY-LYASES, 5074*
    - POLYAMINES, 5074*
  - VIRUS, ROUS SARCOMA
    - CELL TRANSFORMATION, NEOPLASTIC, 4994
    - URIDINE, 5-FLUORO-, 4994

- RNA, RIBOSOMAL
  - CARCINOMA, EHRLICH TUMOR
    - PHOSPHATES, 5335
  - MORPHOLINE, 4-NITROSO-
    - CELL TRANSFORMATION, NEOPLASTIC, 4917
    - LVIER, RAT, 4917

- RNA, TRANSFER
  - ACETIC ACID, COPPER(2+) SALT
    - LEUCINE, 4924
    - LIVER, RAT, 4924
  - BUTYRIC ACID, 2-AMINO-4-(ETHYLTHIO)-
    - ACETIC ACID, COPPER(2+) SALT, 4924
    - LEUCINE, 4924
    - LIVER, RAT, 4924

- RNA, TRANSFER, METHYLTRANSFERASES
  - LEUKEMIA, LYMPHOCYTIC

        - DIAGNOSIS AND PROGNOSIS, 5352
    - LEUKEMIA, MYELOBLASTIC
        - DIAGNOSIS AND PROGNOSIS, 5352
    - LEUKEMIA, MYELOCYTIC
        - DIAGNOSIS AND PROGNOSIS, 5352
    - RNA POLYMERASE
        - DIAGNOSIS AND PROGNOSIS, 5352

- RNA, VIRAL
    - HELA CELLS
        - POLYADENYLATION, 5006
        - VIRUS, RHINO, 5006
    - LEUKEMIA, MYELOBLASTIC
        - VIRUS, C-TYPE BABOON, 5010
    - LEUKEMIA, MYELOCYTIC
        - VIRUS, C-TYPE BABOON, 5010
    - VIRUS, ADENO 2
        - REVIEW, 4823
    - VIRUS, ADENO 5
        - DNA-RNA HYBRIDIZATION, 5085*
    - VIRUS, FELINE LEUKEMIA
        - ULTRASTRUCTURAL STUDY, 5033
    - VIRUS, POLYOMA
        - ISOLATION AND IDENTIFICATION, 5075*
        - VIRUS REPLICATION, 5075*
    - VIRUS, RD-114
        - ULTRASTRUCTURAL STUDY, 5033
    - VIRUS, ROUS SARCOMA
        - HEAT DISSOCIATION, 5041*
        - ULTRASTRUCTURAL STUDY, 5033, 5041*

- SALIVARY GLAND NEOPLASMS
    - ADENOLYMPHOMA
        - ULTRASTRUCTURAL STUDY, 5217*
    - ADENOMA
        - MUCOPOLYSACCHARIDES, 5219*
    - CELLS, CULTURED
        - CELL DIFFERENTIATION, 5219*
        - MUCOPOLYSACCHARIDES, 5219*
    - EPIDEMIOLOGY
        - ALASKA, NATIVES, 5294*

- SALMONELLA TYPHIMURIUM
    - ACENAPHTHENE, 5-NITRO-
        - CARCINOGENIC METABOLITE, 4951*
        - MUTAGENIC ACTIVITY, 4951*
    - GUANIDINE, 1-METHYL-3-NITRO-1-NITROSO-
        - HYPERBARIC OXYGENATION, 4882
    - METHANESULFONIC ACID
        - HYPERBARIC OXYGENATION, 4882
    - PURINE, 2-AMINO-
        - HYPERBARIC OXYGENATION, 4882
    - SCREENING METHOD
        - REVIEW, 4814
    - SULFURIC ACID, DIETHYL ESTER
        - HYPERBARIC OXYGENATION, 4882
    - URIDINE, 5-BROMO-2'-DEOXY-
        - HYPERBARIC OXYGENATION, 4882

- SARCOMA
    - ANTIGENS, NEOPLASM
        - CYTOTOXICITY TESTS, IMMUNOLOGIC, 5123*
    - BENZ(A)ANTHRACENE
        - ARYLOXIRANE DERIVATIVES, 4935*
    - BENZO(A)PYRENE
        - ARYLOXIRANE DERIVATIVES, 4935*
    - CERVIX NEOPLASMS
        - VIRUS, HERPES SIMPLEX 2, 5088*
    - CHOLANTHRENE, 3-METHYL-
        - ANTIGENS, NEOPLASM, 5118*
        - CARCINOGENIC ACTIVITY, FROG, 4900
        - CYCLOHEXANECARBOXYLIC ACID, 4-(AMINOMETHYL)-, 5211
        - IMMUNITY, CELLULAR, 5122*
        - LYMPHOCYTE TRANSFORMATION, 5118*
    - CYCLOHEXANECARBOXYLIC ACID, 4-(AMINOMETHYL)-
        - FIBRINOLYSIS, 5211
        - NEOPLASM METASTASIS, 5211
        - NEOPLASM TRANSPLANTATION, 5211
    - GYNECOLOGIC NEOPLASMS
        - ULTRASTRUCTURAL STUDY, REVIEW, 4850
    - IMMUNE SERUMS
        - IMMUNITY, CELLULAR, 5122*
    - IMMUNITY, CELLULAR
        - BURSA OF FABRICIUS, 5119*
        - CYTOTOXICITY TESTS, IMMUNOLOGIC, 5123*
    - IRON DISULFIDE
        - STRUCTURE-ACTIVITY RELATIONSHIP, 4927
    - KIDNEY NEOPLASMS
        - EPIDEMIOLOGY, GERMANY, 5207
        - UREA, ETHYL NITROSO-, 4893
    - LYMPH NODES
        - DNA REPLICATION, 5118*
    - B-LYMPHOCYTES
        - IMMUNITY, CELLULAR, 5122*
    - T-LYMPHOCYTES
        - IMMUNITY, CELLULAR, 5122*
    - MITOMYCIN C
        - LYMPHOCYTE TRANSFORMATION, 5118*
    - NEOPLASMS, MUSCLE TISSUE
        - IRON, 4925, 4926
    - NEOPLASMS, VASCULAR TISSUE
        - CASE REPORT, 4971
        - POLYETHYLENE TEREPHTHALATE, 4971
        - PROSTHESIS, 4971
    - NICKEL SULFIDE
        - DOSE-RESPONSE STUDY, POWDERS, 4927
        - STRUCTURE-ACTIVITY RELATIONSHIP, 4927
    - STERIGMATOCYSTIN
        - CARCINOGENIC ACTIVITY, RAT, 4802
    - STOMACH NEOPLASMS
        - GUANIDINE, 1-METHYL-3-NITRO-1-NITROSO-, 4920, 4921
    - TANNIC ACID
        - CARCINOGENIC ACTIVITY, RAT, MOUSE, 4809
    - URIDINE, 5-BROMO-2'-DEOXY-
        - C-BINDING, 5365*
        - DNA, NEOPLASM, 5365*
        - KARYOTYPING, 5365*
    - VIRUS, HERPES SIMPLEX 2
        - ANTIGENIC DETERMINANTS, 5088*
        - ANTIGENS, NEOPLASM, 5088*
    - VIRUS, PAPOVA
        - CELL TRANSFORMATION, NEOPLASTIC, 4995
        - NEOPLASM TRANSPLANTATION, 4995
    - VIRUS, RETICULOENDOTHELIOSIS
        - ANTIBODIES, NEOPLASM, 5119*
        - IMMUNITY, CELLULAR, 5119*
        - B-LYMPHOCYTES, 5119*

- VIRUS, ROUS SARCOMA
  - DNA NUCLEOTIDYLTRANSFERASES, 4993
  - REVERSE TRANSCRIPTASE, 4993

SARCOMA 180, CROCKER
- DNA NUCLEOTIDYLTRANSFERASES
  - CELL CYCLE KINETICS, 5353

SARCOMA, MAST CELL
- PAPAIN
  - HISTOCOMPATIBILITY ANTIGENS, 5092
  - IMMUNE RESPONSE, 5092
  - IMMUNE SERUMS, 5092
  - T-LYMPHOCYTES, 5092
- TRYPSIN
  - HISTOCOMPATIBILITY ANTIGENS, 5092
  - IMMUNE RESPONSE, 5092
  - IMMUNE SERUMS, 5092
  - T-LYMPHOCYTES, 5092

SARCOMA, OSTEOGENIC
- LEUKOCYTES
  - TRANSFER FACTOR, 5223*
- NEOPLASM METASTASIS
  - DOUBLING TIME, 5224*
  - LUNG, 5224*
- NEOPLASM TRANSPLANTATION
  - HISTOLOGICAL STUDY, ATHYMIC MOUSE, 5185
- PLUTONIUM
  - ANTIGENIC DETERMINANTS, 4980*
  - HISTOLOGICAL STUDY, 4980*
  - IMMUNE RESPONSE, 4980*
  - LYMPHOCYTE CYTOTOXICITY, 4980*
- RADIUM
  - A-TYPE PARTICLES, 4962
  - ULTRASTRUCTURAL STUDY, MOUSE, 4962
- TRANSFER FACTOR
  - IMMUNITY, CELLULAR, 5223*
  - NEOPLASM METASTASIS, 5223*
  - TREATMENT AND PROGNOSIS, 5223*
- VIRUS, MOLONEY MURINE SARCOMA
  - ANTIGENS, NEOPLASM, 5114*
  - CYTOTOXICITY TESTS, IMMUNOLOGIC, 5114*
  - IMMUNE SERUMS, 5114*
  - VIRUS REPLICATION, RAT TUMOR, 5058*

SARCOMA, RETICULUM CELL
- CELL MEMBRANE
  - CONCANAVALIN A, 5261*
  - GLYCOPROTEINS, 5261*
  - HEXOSES, 5261*
  - PLANT AGGLUTININS, 5261*
- GEOGRAPHY
  - EPIDEMIOLOGY, REVIEW, 4837
- IMMUNOGLOBULINS
  - MURAMIDASE, 5151
- IMMUNOLOGIC DEFICIENCY SYNDROMES
  - REVIEW, 4833
- LUNG NEOPLASMS
  - BENZO(A)PYRENE, 4929*
- B-LYMPHOCYTES
  - IMMUNOGLOBULINS, 5151
- METHANESULFONIC ACID, THIO-, S-METHYL ESTER
  - CELL DIVISION, 5336
- NEOPLASMS, EXPERIMENTAL
  - INCIDENCE RATES, 4973*
- NEUTRONS
  - HISTOLOGICAL STUDY, MOUSE, 4972*
  - INCIDENCE RATES, 4973*
- RADIATION, IONIZING
  - HISTOLOGICAL STUDY, MOUSE, 4972*
  - INCIDENCE RATES, 4973*
- STOMACH NEOPLASMS
  - SOY SAUCE, 4955*
- SULFHYDRYL COMPOUNDS
  - CELL DIVISION, 5336
- TRANSPLANTATION, HOMOLOGOUS
  - REVIEW, 4833
- UTERINE NEOPLASMS
  - TRANSPLANTATION, HOMOLOGOUS, 4898

SARCOMA, YOSHIDA
- BONE MARROW CELLS
  - IMMUNITY, ACTIVE, 5120*
- IMMUNITY, ACTIVE
  - TRANSPLANTATION IMMUNOLOGY, 5120*
- IMMUNOSUPPRESSION
  - TRANSPLANTATION IMMUNOLOGY, 5120*
- B-LYMPHOCYTES
  - TRANSPLANTATION IMMUNOLOGY, 5120*
- T-LYMPHOCYTES
  - IMMUNITY, CELLULAR, 5120*
  - TRANSPLANTATION IMMUNOLOGY, 5120*

SCHISTOSOMIASIS
- BLADDER NEOPLASMS
  - CARCINOMA, EPIDERMOID, 5236*
  - HISTOPATHOLOGICAL STUDY, 5236*
  - OVIPOSITION, 5236*
  - PAPILLOMA, 5236*
- IMMUNOSUPPRESSION
  - INFLAMMATION, 4835
- URETERAL NEOPLASMS
  - HISTOPATHOLOGICAL STUDY, 5236*
  - OVIPOSITION, 5236*

SEBACEOUS GLAND NEOPLASMS
- CARCINOMA
  - EPIDEMIOLOGY, DOG, 5325*
- NEOPLASMS, MULTIPLE PRIMARY
  - EPIDEMIOLOGY, DOG, 5325*

SELENIOUS ACID, DISODIUM SALT
- AFLATOXIN B1
  - ABNORMALITIES, DRUG INDUCED, 4947*
  - LYMPHOCYTE TRANSFORMATION, 4947*
  - XENOPUS LAEVIS, 4947*

SELENIUM
- DIET
  - ANTICARCINOGENIC EFFECT, REVIEW, 5331*
- MAMMARY NEOPLASMS, EXPERIMENTAL
  - ANTICARCINOGENIC EFFECT, REVIEW, 5331*

SEMINOMA
- SEE DISGERMINOMA

SENKIRKINE
- ISOLATION AND CHARACTERIZATION
  - CARCINOGENIC POTENTIAL, RAT, 4804

SEX CHROMATIN

- BREAST NEOPLASMS
    - ESTROGENS, 5166

SIGMOID NEOPLASMS
- COLITIS
    - EPIDEMIOLOGY, 5230*
- HEMORRHOIDS
    - EPIDEMIOLOGY, 5230*
- POLYPS
    - EPIDEMIOLOGY, 5230*

SKIN DISEASES
- ULTRAVIOLET RAYS
    - IMMUNE RESPONSE, REVIEW, 4864*

SKIN NEOPLASMS
- ADENOSINE CYCLIC 3',5' MONOPHOSPHATE
    - CELL DIFFERENTIATION, REVIEW, 4871*
- CARCINOMA, BASAL CELL
    - ELASTIC TISSUE, 5157
    - RADIATION, IONIZING, 4968
    - ULTRASTRUCTURAL STUDY, 5157
- CARCINOMA, EPIDERMOID
    - RADIATION, IONIZING, 4968
- GENETICS
    - REVIEW, 4847
- GUANOSINE CYCLIC 3',5' MONOPHOSPHATE
    - CELL DIFFERENTIATION, REVIEW, 4871*
- PRECANCEROUS CONDITIONS
    - REVIEW, 4847
- RADIATION, IONIZING
    - CASE REPORT, 4968
    - HYPERTRICHOSIS, 4968
    - SIEVE PLATES, 4963
- STERIGMATOCYSTIN
    - CARCINOGENIC ACTIVITY, RAT, 4802
- ULTRAVIOLET RAYS
    - CARCINOGENIC ACTIVITY, REVIEW, 4864*
    - DNA REPAIR, 4817
    - PRECANCEROUS CONDITIONS, 4817
    - REVIEW, 4817

SMOKING
- BLADDER NEOPLASMS
    - EPIDEMIOLOGY, 5282
- BRONCHIAL NEOPLASMS
    - CILIA, 5226*
- CELLS, CULTURED
    - DNA, 4952*
- DNA
    - TOBACCO SUBSTITUTE, 4952*
- LUNG NEOPLASMS
    - EPIDEMIOLOGY, REVIEW, 5280
    - OXYGENASES, 4805
- NICOTINE
    - GASTRIC JUICE, 4902
- NORNICOTINE
    - GASTRIC JUICE, 4902
- TOBACCO
    - DNA, 4952*

SODIUM IODIDE
- BRAIN NEOPLASMS
    - MYOBLASTOMA, 5183

SPLEEN
- VIRUS, FRIEND MURINE LEUKEMIA
    - METHYLTRANSFERASES, 5047*
    - PHOSPHOTRANSFERASES, 5047*
- VIRUS, RAUSCHER MURINE LEUKEMIA
    - METHYLTRANSFERASES, 5047*
    - PHOSPHOTRANSFERASES, 5047*

SPONDYLITIS
- RADIATION, IONIZING
    - RADIOTHERAPY DOSAGE, GONADS, 4969

STEARIC ACID
- HEPATOMA
    - FATTY ACIDS, 5342
    - LIPIDS, 5342

STERIGMATOCYSTIN
- HEPATOMA
    - CARCINOGENIC ACTIVITY, RAT, 4802
- LUNG NEOPLASMS
    - ADENOCARCINOMA, 4802
    - ADENOMA, 4802
    - CARCINOGENIC ACTIVITY, MOUSE, 480
    - ISOLATION AND CHARACTERIZATION, 4802
- PAPILLOMA
    - CARCINOGENIC ACTIVITY, RAT, 4802
- SARCOMA
    - CARCINOGENIC ACTIVITY, RAT, 4802
- SKIN NEOPLASMS
    - CARCINOGENIC ACTIVITY, RAT, 4802

4,4'-STILBENEDIOL, ALPHA,ALPHA'-DIETHYL-
- FETUS
    - METABOLISM, MOUSE, 4945*
- MULLERIAN DUCTS
    - CELL DIFFERENTIATION, 4944*
    - CHICK EMBRYO, 4944*
    - RECEPTORS, HORMONE, 4944*
- PREGNANCY
    - LIVER, MOUSE, 4945*
    - METABOLISM, MOUSE, 4945*
- TRANSFERASES
    - LIVER, MOUSE, 4945*
- VAGINAL NEOPLASMS
    - PRECANCEROUS CONDITIONS, 5175
    - TRANSPLACENTAL CARCINOGENESIS, 5175

STOMACH NEOPLASMS
- ADENOCARCINOMA
    - ALKALINE PHOSPHATASE, 5359
    - CASE REPORT, MENETRIER'S DISEASE, 5204
    - EPIDEMIOLOGY, EAST GERMANY, 5267
    - FETAL GLOBULINS, 5359
    - GUANIDINE, 1-ETHYL-3-NITRO-1-NITROSO-, 4919
    - GUANIDINE, 1-METHYL-3-NITRO-1-NITROSO-, 4921
    - QUINOLINE, 4-NITRO-, 1-OXIDE, 491
- ADENOMA
    - GENETICS, 5200
    - PRECANCEROUS CONDITIONS, 4844, 5200
- ALKALINE PHOSPHATASE
    - CASE REPORT, 5359
- ATAXIA TELANGIECTASIA
    - EPIDEMIOLOGY, 5317*

- ARCINOMA
  - CASE REPORT, MENETRIER'S DISEASE, 5204
  - EPIDEMIOLOGY, EAST GERMANY, 5267
  - GUANIDINE, 1-METHYL-3-NITRO-1-NITROSO-, 4920
  - NEOPLASM METASTASIS, 5205
- ARCINOMA 256, WALKER
  - GUANIDINE, 1-ETHYL-3-NITRO-1-NITROSO-, 4916
- IETHYLAMINE, N-NITROSO-
  - P-CRESOL, 2,6-DI-TERT-BUTYL-, 4954*
- THNIC GROUPS
  - EPIDEMIOLOGY, SINGAPORE, 5292*
- ETAL GLOBULINS
  - CASE REPORT, 5359
  - DIAGNOSIS AND PROGNOSIS, 5201
- ALACTOSIDASES
  - DIAGNOSIS AND PROGNOSIS, 5201
- ASTRECTOMY
  - DIAGNOSIS AND PROGNOSIS, 5303*
  - EPIDEMIOLOGY, 5233*, 5303*
  - EPIDEMIOLOGY, EAST GERMANY, 5267
- ASTRIN
  - DIAGNOSIS AND PROGNOSIS, 5201
- ASTRITIS
  - EPIDEMIOLOGY, EAST GERMANY, 5267
  - LACTATE DEHYDROGENASE, 5229*
- LYCOPROTEINS
  - DIAGNOSIS AND PROGNOSIS, 5201
- REATER CURVATURE
  - DIAGNOSIS, 5202
  - EPIDEMIOLOGY, 5202
- UANIDINE, 1-ETHYL-3-NITRO-1-NITROSO-
  - IMMUNE RESPONSE, RAT, 4916
  - NEOPLASM TRANSPLANTATION, 4919
- UANIDINE, 1-METHYL-3-NITRO-1-NITROSO-
  - CARCINOGENIC ACTIVITY, DOG, 4920
  - CARCINOGENIC ACTIVITY, RAT, 4921
- NTESTINAL POLYPS
  - GENETICS, 5200
  - PRECANCEROUS CONDITIONS, 5200
- ACTATE DEHYDROGENASE
  - ISOENZYMES, 5229*
  - PRECANCEROUS CONDITIONS, 5229*
- YMPHOMA
  - CLASSIFICATION, REVIEW, 5302*
  - DIAGNOSIS AND TREATMENT, REVIEW, 5302*
  - EPIDEMIOLOGY, REVIEW, 5302*
- ETAPLASIA
  - LACTATE DEHYDROGENASE, 5229*
- EPTIC ULCER
  - CASE REPORT, 5203
  - PRECANCEROUS CONDITIONS, 5203
- LASMA CELLS
  - NEOPLASM METASTASIS, 5205
- OLYPS
  - EPIDEMIOLOGY, EAST GERMANY, 5267
  - PRECANCEROUS CONDITIONS, 4844
- RECANCEROUS CONDITIONS
  - EPIDEMIOLOGICAL STUDY, JAPAN, 4844
  - EPIDEMIOLOGY, REVIEW, 5302*
  - GASTRECTOMY, 5233*
  - GUANIDINE, 1-METHYL-3-NITRO-1-NITROSO-, 4921
  - HISTOLOGICAL STUDY, 4844
- UINOLINE, 4-NITRO-, 1-OXIDE
    - NEOPLASM TRANSPLANTATION, 4919
  - SARCOMA
    - GUANIDINE, 1-METHYL-3-NITRO-1-NITROSO-, 4920, 4921
  - SARCOMA, RETICULUM CELL
    - SOY SAUCE, 4955*
  - SOY SAUCE
    - CARCINOGENIC POTENTIAL, RAT, 4955*

- STRONTIUM RADIOISOTOPES
  - LEUKEMIA
    - CELL DIFFERENTIATION, 4975*
    - HYPERSENSITIVITY, DELAYED, 4975*
    - IMMUNE RESPONSE, 4975*
    - THYMECTOMY, 4975*
    - THYMOMA, 4975*
  - RADIOACTIVE FALLOUT
    - DEPOSITION, TOKYO, 5328*
    - WEATHER, JAPAN, 5329*

- SULFHYDRYL COMPOUNDS
  - LEUKEMIA L1210
    - CELL DIVISION, 5336
  - PLASMACYTOMA
    - CELL DIVISION, 5336
  - POLY C
    - RNA POLYMERASE, 5044*
  - SARCOMA, RETICULUM CELL
    - CELL DIVISION, 5336

- SULFINPYRAZONE
  - LEUKEMIA, MYELOCYTIC
    - CASE REPORT, 4923
    - GOUT, 4923
  - MULTIPLE MYELOMA
    - CASE REPORT, 4923
    - GOUT, 4923

- SULFURIC ACID, DIETHYL ESTER
  - HYPERBARIC OXYGENATION
    - MUTAGENIC ACTIVITY, 4882
  - SALMONELLA TYPHIMURIUM
    - HYPERBARIC OXYGENATION, 4882

- TALC
  - NEOPLASMS, EXPERIMENTAL
    - FIBER STRUCTURE, 4931*

- TANNIC ACID
  - HEPATOMA
    - CARCINOGENIC ACTIVITY, RAT, MOUSE, 4809
    - ISOLATION AND CHARACTERIZATION, 4809
  - SARCOMA
    - CARCINOGENIC ACTIVITY, RAT, MOUSE, 4809

- TARS
  - BLADDER NEOPLASMS
    - EPIDEMIOLOGY, WEST GERMANY, 5283
    - OCCUPATIONAL HAZARD, 5283
  - UROGENITAL NEOPLASMS
    - EPIDEMIOLOGY, WEST GERMANY, 5283
    - OCCUPATIONAL HAZARD, 5283

- TERATOGENS
  - NERVOUS SYSTEM NEOPLASMS
    - VIRUS, SV40, 5013

- TERATOID TUMOR
  - ANTIGENS
    - CELL DIFFERENTIATION, 4829
  - CELL MEMBRANE
    - CELL DIFFERENTIATION, 4829
  - UROGENITAL NEOPLASMS
    - CELL CYCLE KINETICS, 5170
    - DNA, NEOPLASM, 5170
    - KARYOTYPING, 5170

- TESTICULAR NEOPLASMS
  - VIRUS, HERPES SIMPLEX 2
    - ANTIGENS, VIRAL, 5022
    - PRECANCEROUS CONDITIONS, 5022

- TESTIS
  - CARBAMIC ACID, ETHYL ESTER
    - EMBRYO, MOUSE, 4941*

- 12-O-TETRADECANOYLPHORBOL-13-ACETATE
  - BENZ(A)ANTHRACENE, 7,12-DIMETHYL-
    - CELL TRANSFORMATION, NEOPLASTIC, 4904
  - BENZO(A)PYRENE
    - CELL TRANSFORMATION, NEOPLASTIC, 4904
  - CELL DIFFERENTIATION
    - EPIDERMIS, MOUSE, 4936*
    - HISTOLOGICAL STUDY, 4936*
    - KERATIN PRECURSORS, 4936*
  - CHOLANTHRENE, 3-METHYL-
    - CELL TRANSFORMATION, NEOPLASTIC, 4904
  - PROTEINS
    - EPIDERMIS, MOUSE, 4936*

- THECA CELL TUMOR
  - OVARIAN NEOPLASMS
    - RADIATION, IONIZING, 4965

- THEOPHYLLINE
  - MELANOMA
    - ADENOSINE CYCLIC 3',5' MONOPHOSPHATE, 5388*

- THORACIC NEOPLASMS
  - NEURILEMMOMA
    - CASE REPORT, 5240*
    - VAGUS NERVE, 5240*

- THORIUM DIOXIDE
  - HYDROCHLORIC ACID
    - SOLUBILITY, 4961
  - PAROTID NEOPLASMS
    - CASE REPORT, BILATERAL TUMOR, 5218*
  - RADIOISOTOPES
    - GASTRIC JUICE, 4961
  - SODIUM
    - SOLUBILITY, 4961
  - SOLUBILITY
    - GASTRIC JUICE, 4961

- THREITOL, 1,4-DITHIO-
  - VIRUS, MENGO
    - VIRAL PROTEINS, 5030

- THYMECTOMY
  - LEUKEMIA
    - RADIATION, IONIZING, 4975*
    - STRONTIUM RADIOISOTOPES, 4975*

- THYMIDINE
  - MELANOMA
    - DNA, 5384*
    - SURFACE PROPERTIES, 5384*

- THYMOMA
  - ISOANTIGENS
    - IMMUNE SERUMS, 5115*
  - LEUKEMIA
    - RADIATION, IONIZING, 4975*
    - STRONTIUM RADIOISOTOPES, 4975*
  - T-LYMPHOCYTES
    - SURFACE MARKERS, 5115*
  - RADIATION
    - CELL DIFFERENTIATION, 4979*
  - RADIATION, IONIZING
    - P-CRESOL, 2,6-DI-TERT-BUTYL-, 4954*

- THYMUS
  - RADIATION
    - CELL CYCLE KINETICS, 4979*

- THYROID NEOPLASMS
  - ADENOCARCINOMA
    - DIAGNOSIS AND TREATMENT, 5309*
    - EPIDEMIOLOGY, 5311*
    - EPIDEMIOLOGY, SCANDINAVIA, 5309*
  - ADRENAL GLAND NEOPLASMS
    - GENETICS, 5160
    - PHEOCHROMOCYTOMA, 5160
  - CARCINOMA
    - CHROMOSOMES, HUMAN, 6-12, 5232*
    - EPIDEMIOLOGY, 5311*
  - CARCINOMA, PAPILLARY
    - DIAGNOSIS AND TREATMENT, 5309*
    - EPIDEMIOLOGY, 5311*
    - EPIDEMIOLOGY, SCANDINAVIA, 5309*
  - EPIDEMIOLOGY
    - ALASKA, NATIVES, 5294*
  - HISTOCOMPATIBILITY ANTIGENS
    - CHROMOSOMES, HUMAN, 6-12, 5232*
  - HYPERPARATHYROIDISM
    - RADIATION, IONIZING, 4983*
  - IODINE RADIOISOTOPES
    - EPIDEMIOLOGY, 5326*
    - THYROTROPIN, 4982*
  - ISOANTIGENS
    - HISTOCOMPATIBILITY ANTIGENS, 5232*
  - NEOPLASM METASTASIS
    - EPIDEMIOLOGY, 5311*
  - NEOPLASTIC ENDOCRINE-LIKE SYNDROMES
    - CHROMOSOMES, HUMAN, 6-12, 5232*
  - PHEOCHROMOCYTOMA
    - PRECANCEROUS CONDITIONS, 5160
  - RADIATION, IONIZING
    - DIAGNOSIS AND PROGNOSIS, 4821
    - RADIOTHERAPY, CHILD, 4821
  - URACIL, 6-PROPYL-2-THIO-
    - IODINE RADIOISOTOPES, 4982*
    - THYROTROPIN, 4982*

- THYROTROPIN
  - THYROID NEOPLASMS
    - IODINE RADIOISOTOPES, 4982*
    - URACIL, 6-PROPYL-2-THIO-, 4982*

- TISSUE CULTURE
  - ADENOIDS
    - CELLS, CULTURED, 5332
    - EPITHELIUM CELLS, 5332
  - BURKITT'S LYMPHOMA
    - AGE FACTORS, 5354
    - ENZYMATIC ACTIVITY, 5354
  - MAMMARY NEOPLASMS, EXPERIMENTAL
    - INSULIN, 5379*
    - LIPIDS, 5379*

- TOBACCO
  - BENZ(A)ANTHRACENE
    - QUANTITATION METHOD, 4903
  - BENZO(A)PYRENE
    - QUANTITATION METHOD, 4903
  - CHRYSENE
    - QUANTITATION METHOD, 4903
  - SMOKING
    - DNA, 4952*

- TONSILLECTOMY
  - LEUKEMIA
    - EPIDEMIOLOGY, CHILD, 5147

- TRACHEA
  - VIRUS, ROUS SARCOMA
    - ULTRASTRUCTURAL STUDY, 5037*

- TRANSFER FACTOR
  - SARCOMA, OSTEOGENIC
    - IMMUNITY, CELLULAR, 5223*
    - LEUKOCYTES, 5223*
    - NEOPLASM METASTASIS, 5223*
    - TREATMENT AND PROGNOSIS, 5223*

- TRANSFERASES
  - 4,4'-STILBENEDIOL, ALPHA,ALPHA'-DIETHYL-
    - LIVER, MOUSE, 4945*

- TRANSFORMATION, GENETIC
  - VIRUS, B77
    - ADENYL CYCLASE, 5042*
    - CELL TRANSFORMATION, NEOPLASTIC, 5042*
    - TEMPERATURE SENSITIVE MUTANTS, 5042*
  - VIRUS, ROUS SARCOMA
    - ADENYL CYCLASE, 5042*
    - CELL TRANSFORMATION, NEOPLASTIC, 5042*
    - TEMPERATURE SENSITIVE MUTANTS, 5042*

- TRANSPLANTATION
  - VIRUS, CYTOMEGALO
    - CELL SURVIVAL, 5117*
  - VIRUS, HERPES SIMPLEX 1
    - CELL SURVIVAL, 5117*
  - VIRUS, HERPES SIMPLEX 2
    - CELL SURVIVAL, 5117*
    - ULTRAVIOLET RAYS, 5117*

- TRANSPLANTATION ANTIGENS
  - SEE HISTOCOMPATIBILITY ANTIGENS

- TRANSPLANTATION, AUTOLOGOUS
  - VIRUS, MURINE LEUKEMIA
    - HISTOLOGICAL STUDY, SPLEEN, 5046*

- TRANSPLANTATION, HOMOLOGOUS
  - ERYTHREMIC MYELOSIS
    - CASE REPORT, 5237*
  - HEPATOMA
    - CELL DIFFERENTIATION, 4898
  - KIDNEY NEOPLASMS
    - CELL DIFFERENTIATION, 4898
  - LEUKEMIA
    - RADIATION EFFECTS, 4984*
  - LIVER NEOPLASMS
    - ADENOCARCINOMA, 4898
    - CELL DIFFERENTIATION, 4898
  - LYMPHOSARCOMA
    - CELL DIFFERENTIATION, 4898
  - NEOPLASMS, EXPERIMENTAL
    - NITROSAMINES, 4898
  - RADIATION, IONIZING
    - DOSE-RESPONSE STUDY, 4984*
    - KIDNEY, 4984*
  - SARCOMA, RETICULUM CELL
    - REVIEW, 4833
  - UTERINE NEOPLASMS
    - CELL DIFFERENTIATION, 4898
    - SARCOMA, RETICULUM CELL, 4898

- TRANSPLANTATION IMMUNOLOGY
  - SARCOMA, YOSHIDA
    - IMMUNITY, ACTIVE, 5120*
    - IMMUNOSUPPRESSION, 5120*
    - B-LYMPHOCYTES, 5120*
    - T-LYMPHOCYTES, 5120*
  - VIRUS, MURINE LEUKEMIA
    - HEMATOPOIETIC STEM CELLS, 5046*

- TRIAZENE, 3,3-DIMETHYL-1-PHENYL-
  - MICROSOMES, LIVER
    - ALKYLATION, 4895

- TRIETHYLAMINE, 2-(P-(2-CHLORO-1,2-DIPHENYLVINYL)PHENOXY)-, CITRAT
  - PITUITARY NEOPLASMS
    - ADENOMA, 5168
    - CASE REPORT, 5168

- TRITIUM
  - MAMMARY NEOPLASMS, EXPERIMENTAL
    - ADENOFIBROMA, 4959
    - RADIATION DOSAGE, 4959

- TRYPSIN
  - CELL MEMBRANE
    - AGGLUTINATION, 5338
  - SARCOMA, MAST CELL
    - HISTOCOMPATIBILITY ANTIGENS, 5092
    - IMMUNE RESPONSE, 5092
    - IMMUNE SERUMS, 5092
  - VIRUS, MURINE MAMMARY TUMOR
    - ANTIGENS, VIRAL, 5066*
    - GLYCOPROTEINS, 5066*

- TUBERCIDIN, 5-BROMO-
  - VIRUS, ROUS SARCOMA
    - PEPTIDE HYDROLASES, 4991

- TUBERCULOSIS, PLEURAL
  - LUNG NEOPLASMS
    - EPIDEMIOLOGY, 5278

- TURNER'S SYNDROME
  - DISGERMINOMA
    - CASE REPORT, 5178
    - KARYOTYPING, 5178

- TYROSINE AMINOTRANSFERASE
  - HEPATOMA
    - DEXAMETHASONE, 5358

- ULTRAVIOLET RAYS
  - ANTHRACENE
    - CHOLESTEROL, 4901
  - BENZO(A)PYRENE
    - CHOLESTEROL, 4901
  - CHOLANTHRENE, 3-METHYL-
    - CHOLESTEROL, 4901
  - DNA
    - REVIEW, 4819
  - DNA REPAIR
    - REVIEW, 4817
  - DRUGS
    - IMMUNE RESPONSE, REVIEW, 4864*
  - NUCLEIC ACIDS
    - CARCINOGENIC ACTIVITY, REVIEW, 4864*
    - CROSS-LINKING, REVIEW, 4815
    - REVIEW, 4816, 4819
  - SKIN DISEASES
    - IMMUNE RESPONSE, REVIEW, 4864*
  - SKIN NEOPLASMS
    - CARCINOGENIC ACTIVITY, REVIEW, 4864*
    - DNA REPAIR, 4817
    - PRECANCEROUS CONDITIONS, 4817
    - REVIEW, 4817
  - VIRUS, HERPES SIMPLEX
    - VIRUS REPLICATION, 5017
  - VIRUS, HERPES SIMPLEX 1
    - IMMUNE RESPONSE, 5095
  - VIRUS, HERPES SIMPLEX 2
    - CELL SURVIVAL, 5117*
    - IMMUNE RESPONSE, 5095
    - TRANSPLANTATION, 5117*
  - XERODERMA PIGMENTOSUM
    - DNA REPAIR, 5159

- URACIL, 6-PROPYL-2-THIO-
  - THYROID NEOPLASMS
    - IODINE RADIOISOTOPES, 4982*
    - THYROTROPIN, 4982*

- URANIUM
  - PNEUMOCONIOSIS
    - HISTOPATHOLOGICAL STUDY, RAT, 4974*
    - PROLINE, 4-HYDROXY-, 4974*

- UREA, ETHYL NITROSO-
  - KIDNEY NEOPLASMS
    - ADENOCARCINOMA, 4893
    - NEPHROBLASTOMA, 4893
    - SARCOMA, 4893
    - TRANSPLACENTAL CARCINOGENESIS, RABBIT, 4893

- UREA, METHYL NITROSO-
  - BLADDER NEOPLASMS
    - CELL MEMBRANE, 4956*
    - CELL TRANSFORMATION, NEOPLASTIC, 4956*
    - EPITHELIAL CELLS, 4956*
  - BONE MARROW CELLS
    - HEMATOPOIETIC STEM CELLS, 4894
  - CELL MEMBRANE
    - EPITHELIAL CELLS, 4956*
  - CELL TRANSFORMATION, NEOPLASTIC
    - EPITHELIAL CELLS, 4956*
  - GLIOMA
    - IMMUNITY, CELLULAR, 5113*
  - LEUKEMIA
    - BONE MARROW CELLS, 4894
    - IMMUNOGLOBULINS, 4894
    - B-LYMPHOCYTES, 4894

- URETERAL NEOPLASMS
  - CARCINOMA, TRANSITIONAL CELL
    - CASE REPORT, 5231*
  - FIBROMA
    - CASE REPORT, 5231*
  - SCHISTOSOMIASIS
    - HISTOPATHOLOGICAL STUDY, 5236*
    - OVIPOSITION, 5236*

- URETHRAL NEOPLASMS
  - ENDOMETRIOSIS
    - CELL DIFFERENTIATION, 4846
    - REVIEW, 4846

- URIDINE, 5-BROMO-2'-DEOXY-
  - DNA
    - MUTAGENIC ACTIVITY, 5363*
  - HYPERBARIC OXYGENATION
    - MUTAGENIC ACTIVITY, 4882
  - L CELLS
    - C-BINDING, 5365*
    - DNA, NEOPLASM, 5365*
    - KARYOTYPING, 5365*
  - MELANOMA
    - DEOXY SUGARS, 5375*
    - DNA, 5384*
    - LIPIDS, 5375*
    - SURFACE PROPERTIES, 5375*, 5384*
  - NEUROBLASTOMA
    - ADENOSINE CYCLIC 3',5' MONOPHOSPHATE, 5392*
  - SALMONELLA TYPHIMURIUM
    - HYPERBARIC OXYGENATION, 4882
  - SARCOMA
    - C-BINDING, 5365*
    - DNA, NEOPLASM, 5365*
    - KARYOTYPING, 5365*
  - VIRUS, C-TYPE RNA TUMOR
    - VIRUS INDUCTION, 4997

- URIDINE, 2'-DEOXY-5-ETHYL-
  - MELANOMA
    - DNA, 5384*
    - SURFACE PROPERTIES, 5384*

- URIDINE, 2'-DEOXY-5-IODO-
  - VIRUS, HERPES SIMPLEX 1
    - ANTIGENS, VIRAL, 5087*

- URIDINE, 5-FLUORO-
  - VIRUS, ROUS SARCOMA
    - RNA REPLICATION, 4994
    - VIRUS REPLICATION, 4994

UROGENITAL NEOPLASMS
    ADENOMA
        EPIDEMIOLOGY, HAMSTER, 5276
    CARCINOMA
        CELL CYCLE KINETICS, 5170
        DNA, NEOPLASM, 5170
        KARYOTYPING, 5170
    CARCINOSARCOMA
        CELL CYCLE KINETICS, 5170
        KARYOTYPING, 5170
    ESTROGENS
        GLYCOPROTEINS, 5167
    GRANULOSA CELL TUMOR
        CELL CYCLE KINETICS, 5170
        DNA, NEOPLASM, 5170
        KARYOTYPING, 5170
    LEUKEMIA, LYMPHOCYTIC
        IMMUNITY, CELLULAR, 5124*
    PREGNANCY
        EPIDEMIOLOGY, 5272
    TARS
        EPIDEMIOLOGY, WEST GERMANY, 5283
        OCCUPATIONAL HAZARD, 5283
    TERATOID TUMOR
        CELL CYCLE KINETICS, 5170
        DNA, NEOPLASM, 5170
        KARYOTYPING, 5170

UTERINE NEOPLASMS
    ADENOMA
        REVIEW, 4848
    ELASTIC TISSUE
        CELL DIFFERENTIATION, 5171
        PRECANCEROUS CONDITIONS, 5171
    ENDOMETRIUM
        EPIDEMIOLOGY, JAPAN, 5314*
    ESTROGENS
        EPIDEMIOLOGY, 4855
        MENOPAUSE, 4855
    MYCOPLASMA INFECTIONS
        PRECANCEROUS CONDITIONS, 5176
    PRECANCEROUS CONDITIONS
        REVIEW, 4848
    SARCOMA, RETICULUM CELL
        TRANSPLANTATION, HOMOLOGOUS, 4898
    TRANSPLANTATION, HOMOLOGOUS
        CELL DIFFERENTIATION, 4898
    VIRUS, HERPES SIMPLEX
        IMMUNE SERUMS, 5020

VAGINA
    5ALPHA-ANDROSTAN-3-ONE, 17BETA-HYDROXY-
        DECIDUA, 4886
        ESTRADIOL, 4886
        PROGESTERONE, 4886

VAGINAL NEOPLASMS
    CONTRACEPTIVE DEVICES, FEMALE
        PRECANCEROUS CONDITIONS, 5175
    4,4'-STILBENEDIOL, ALPHA,ALPHA'-
      DIETHYL-
        PRECANCEROUS CONDITIONS, 5175
        TRANSPLACENTAL CARCINOGENESIS,
          5175

VAGINAL SMEARS
    CERVIX NEOPLASMS
        EPIDEMIOLOGY, YOUNG WOMAN, 5172
        MYCOPLASMA INFECTIONS, 5176

VAGUS NERVE
    THORACIC NEOPLASMS
        NEURILEMMOMA, 5240*

VENEREAL DISEASES
    CERVIX NEOPLASMS
        VIRUS, HERPES SIMPLEX 2, 4825

VINCALEUKOBLASTINE
    CARCINOMA, EHRLICH TUMOR
        CELL CYCLE KINETICS, 5366*
        CHROMOSOME ABERRATIONS, 5366*

VINCALEUKOBLASTINE, SULFATE
    VIRUS, KIRSTEN MURINE SARCOMA-LEUKEMIA
        VIRUS REPLICATION, 5001

VINYL CHLORIDE
    SEE ETHYLENE, CHLORO-

VIRAL PROTEINS
    VIRUS, ADENO 2
        DNA, VIRAL, 5023
    VIRUS, FELINE LEUKEMIA
        ISOLATION AND CHARACTERIZATION,
          5060*
    VIRUS, MENGO
        ETHANOL, 2-MERCAPTO-, 5030
        L CELLS, 5030
        THREITOL, 1,4-DITHIO-, 5030
        ZINC CHLORIDE, 5030
    VIRUS, MURINE LEUKEMIA
        HYBRID CELLS, 5071*
    VIRUS, MURINE MAMMARY TUMOR
        A-TYPE PARTICLES, 5065*
        ISOLATION AND CHARACTERIZATION,
          5065*
    VIRUS, SIMIAN SARCOMA
        ANTIGENIC DETERMINANTS, 5060*
        ISOLATION AND CHARACTERIZATION,
          5060*
    VIRUS, SV40
        HYBRID CELLS, 5071*

VIRAL VACCINES
    VIRUS, GARDNER ARNSTEIN FELINE SARCOMA
        IMMUNITY, PASSIVE, 5002
    VIRUS, RICKARD FELINE LEUKEMIA
        IMMUNITY, PASSIVE, 5002
    VIRUS, SYNDER-THEILEN FELINE SARCOMA
        IMMUNITY, PASSIVE, 5002

VIRUS, ADENO 1
    DNA, SINGLE-STRANDED
        NUCLEOPROTEINS, 5080*
    DNA, VIRAL
        NUCLEOPROTEINS, 5080*
    NUCLEOPROTEINS
        VIRUS REPLICATION, 5080*

VIRUS, ADENO 2
    ANTIGENS, NEOPLASM
        CELL TRANSFORMATION, NEOPLASTIC,
          5079*
    CELL MEMBRANE
        PEPTIDES, 5084*
    DNA REPLICATION

    - CELL TRANSFORMATION, NEOPLASTIC, 5023
  - DNA, VIRAL
    - VIRAL PROTEINS, 5023
  - GENETICS
    - REVIEW, 4823
  - GLOBULINS
    - ANTIGENS, NEOPLASM, 5079*
  - HELA CELLS
    - DNA, VIRAL, 5081*
    - NUCLEOPROTEINS, 5081*
    - PEPTIDES, 5084*
    - RNA POLYMERASE, 5081*
  - IMMUNOGLOBULINS, SURFACE
    - CELL TRANSFORMATION, NEOPLASTIC, 5079*
  - PEPTIDES
    - ISOLATION AND CHARACTERIZATION, 5084*
  - RNA, MESSENGER
    - ISOLATION AND CHARACTERIZATION, 5023
    - REVIEW, 4823
  - RNA REPLICATION
    - DNA REPLICATION, 5023
    - DNA-RNA HYBRIDIZATION, 5023
  - RNA, VIRAL
    - REVIEW, 4823

- VIRUS, ADENO 5
  - DNA, VIRAL
    - DNA-RNA HYBRIDIZATION, 5085*
  - RNA, MESSENGER
    - VIRUS REPLICATION, 5085*
  - RNA, VIRAL
    - DNA-RNA HYBRIDIZATION, 5085*

- VIRUS, ADENO 7
  - DNA REPLICATION
    - CELL TRANSFORMATION, NEOPLASTIC, 5023

- VIRUS, ADENO 12
  - DNA REPLICATION
    - CELL TRANSFORMATION, NEOPLASTIC, 5023
  - EYE NEOPLASMS
    - RETINOBLASTOMA, 5024
  - HISTOCHEMICAL STUDY, HAMSTER
    - PERITONEAL NEOPLASMS, 5083*
  - LIVER NEOPLASMS
    - HISTOCHEMICAL STUDY, HAMSTER, 5083*
    - ULTRASTRUCTURAL STUDY, HAMSTER, 5083*
  - PERITONEAL NEOPLASMS
    - ULTRASTRUCTURAL STUDY, HAMSTER, 5083*
  - RETINOBLASTOMA
    - ANTIGENS, VIRAL, 5024
    - ULTRASTRUCTURAL STUDY, RAT, 5024

- VIRUS, AVIAN LEUKOSIS
  - HEPATOMA
    - ENZYMATIC ACTIVITY, 4987

- VIRUS, AVIAN MYELOBLASTOSIS
  - ANTINEOPLASTIC AGENTS
    - REVERSE TRANSCRIPTASE, 5034
  - DNA, NEOPLASM
    - TRANSFORMATION, GENETIC, 4992
  - MULTIPLE MYELOMA
    - DNA-RNA HYBRIDIZATION, 5144*

- VIRUS, AVIAN SARCOMA
  - DNA, NEOPLASM
    - TRANSFORMATION, GENETIC, 4992

- VIRUS, B77
  - DNA NUCLEOTIDYLTRANSFERASES
    - TEMPERATURE SENSITIVE MUTANTS, 4996
  - REVERSE TRANSCRIPTASE
    - TEMPERATURE SENSITIVE MUTANTS, 4996
  - TRANSFORMATION, GENETIC
    - ADENYL CYCLASE, 5042*
    - CELL TRANSFORMATION, NEOPLASTIC, 5042*
    - TEMPERATURE SENSITIVE MUTANTS, 5042*

- VIRUS, B-TROPIC MURINE LEUKEMIA
  - VIRUS REPLICATION
    - HYBRID CELLS, 5000

- VIRUS, B-TYPE RNA TUMOR
  - BREAST NEOPLASMS
    - NUCLEIC ACID HYBRIDIZATION, 4820
    - REVIEW, 4820
    - VIRUS, MURINE MAMMARY TUMOR, 4820

- VIRUS, BOVINE LEUKEMIA
  - ANTIGENS, VIRAL
    - ANTIBODY FORMATION, 5004
  - CELLS, CULTURED
    - VIRUS REPLICATION, 5003
  - DNA, VIRAL
    - DNA-RNA HYBRIDIZATION, 5004
  - LYMPHATIC NEOPLASMS
    - SUBCELLULAR FRACTIONS, 5005
  - SUBCELLULAR FRACTIONS
    - IMMUNE RESPONSE, 5005
  - VIRUS, RAUSCHER MURINE LEUKEMIA
    - DNA-RNA HYBRIDIZATION, 5004

- VIRUS, C-TYPE BABOON
  - LEUKEMIA, MYELOBLASTIC
    - DNA-RNA HYBRIDIZATION, 5010
    - RNA, VIRAL, 5010
  - LEUKEMIA, MYELOCYTIC
    - DNA-RNA HYBRIDIZATION, 5010
    - RNA, VIRAL, 5010

- VIRUS, C-TYPE RNA TUMOR
  - ANTIBODY SPECIFICITY
    - IMMUNOELECTRON MICROSCOPY, 5138*
  - ANTIGENS, VIRAL
    - ANTIGENIC DETERMINANTS, 5138*
    - IMMUNOELECTRON MICROSCOPY, 5138*
    - REVERSE TRANSCRIPTASE, 5011
  - CONCANAVALIN A
    - VIRUS INDUCTION, 4997
  - LIPOPOLYSACCHARIDES
    - VIRUS INDUCTION, 5031
  - B-LYMPHOCYTES
    - VIRUS INDUCTION, 4997, 5031
  - T-LYMPHOCYTES

    - VIRUS INDUCTION, 4997, 5031
  - LYMPHOSARCOMA
    - ISOLATION AND CHARACTERIZATION, 5032
    - VIRUS REPLICATION, 5032
  - MACROPHAGES
    - VIRUS INDUCTION, 4997
  - PCLYSACCHARIDES
    - VIRUS INDUCTION, 4997
  - URIDINE, 5-BROMO-2'-DEOXY-
    - VIRUS INDUCTION, 4997

- VIRUS, CYTOMEGALO
  - TRANSPLANTATION
    - CELL SURVIVAL, 5117*

- VIRUS, EPSTEIN-BARR
  - ANTIBODIES, VIRAL
    - CELL TRANSFORMATION, NEOPLASTIC, 5026
    - IMMUNE RESPONSE, REVIEW, 4826
    - LYMPHOCYTE TRANSFORMATION, 5026
  - ANTIGENS, VIRAL
    - CELL TRANSFORMATION, NEOPLASTIC, 5026
    - IMMUNE RESPONSE, REVIEW, 4826
    - LYMPHOCYTE TRANSFORMATION, 5026
  - BURKITT'S LYMPHOMA
    - CARCINOGENIC POTENTIAL, REVIEW, 4824
  - CELL TRANSFORMATION, NEOPLASTIC
    - IMMUNE RESPONSE, REVIEW, 4826
  - DNA, VIRAL
    - CELL TRANSFORMATION, NEOPLASTIC, 5091*
    - B-LYMPHOCYTES, 5091*
  - IMMUNE SERUMS
    - ANTIGEN-ANTIBODY REACTIONS, 5025
    - VIRUS REPLICATION, MARMOSET, 5025
  - INFECTIOUS MONONUCLEOSIS
    - IMMUNITY, CELLULAR, 5121*
    - IMMUNOSUPPRESSION, 5121*
    - LEUKOCYTE TRANSFORMATION, 5028
  - LYMPHADENTIS
    - MARMOSET, 5025
  - B-LYMPHOCYTES
    - CELL TRANSFORMATION, NEOPLASTIC, 5091*
  - NASOPHARYNGEAL NEOPLASMS
    - CARCINOGENIC POTENTIAL, REVIEW, 4824
    - DNA-RNA HYBRIDIZATION, 5027
    - DNA, VIRAL, 5027
    - VIRUS REPLICATION, 5090*
  - VIRUS REPLICATION
    - IMMUNE RESPONSE, REVIEW, 4826

- VIRUS, FELINE LEUKEMIA
  - CELL MEMBRANE
    - ANTIGEN-ANTIBODY REACTIONS, 5063*
    - ANTIGENS, VIRAL, 5063*
  - LEUKEMIA, LYMPHOCYTIC
    - EPIDEMIOLOGY, 5061*
  - LYMPHCMA
    - HORIZONTAL TRANSMISSION THEORY, 5322*
  - LYMPHCSARCOMA
    - EPIDEMIOLOGY, 5061*
  - MYELOPROLIFERATIVE DISORDERS
    - EPIDEMIOLOGY, 5061*
  - RNA, VIRAL
    - ULTRASTRUCTURAL STUDY, 5033
  - VIRAL PROTEINS
    - ISOLATION AND CHARACTERIZATION, 5060*

- VIRUS, FRIEND MURINE LEUKEMIA
  - ANESTHETICS
    - CELL DIFFERENTIATION, 5045*
  - ANTIGENS, NEOPLASM
    - IMMUNOFERRITIN ASSAY, 5130*
  - ANTIGENS, VIRAL
    - C-TYPE PARTICLES, 5130*
    - IMMUNOFERRITIN ASSAY, 5130*
  - CELL MEMBRANE
    - CELL DIFFERENTIATION, 5045*
  - ERYTHROLEUKEMIA
    - CELL DIFFERENTIATION, 5045*
    - HEMOGLOBINS, 4998
  - GOLGI APPARATUS
    - CELL TRANSFORMATION, NEOPLASTIC, 5050*
  - HISTOCOMPATIBILITY ANTIGENS
    - IMMUNOFERRITIN ASSAY, 5130*
  - LEUKEMIA
    - IMMUNE RESPONSE, MOUSE, 4999
    - IMMUNOGLOBULINS, SURFACE, 4999
    - T-LYMPHOCYTES, 4999
  - B-LYMPHOCYTES
    - IMMUNE RESPONSE, MOUSE, 5108
    - IMMUNOSUPPRESSION, 5108
  - T-LYMPHOCYTES
    - IMMUNE RESPONSE, MOUSE, 5108
    - IMMUNOSUPPRESSION, 5108
  - MACROPHAGES
    - IMMUNE RESPONSE, MOUSE, 5108
    - IMMUNOSUPPRESSION, 5108
  - METHANE, SULFINYLBIS-
    - CELL DIFFERENTIATION, 5045*
  - METHYLTRANSFERASES
    - VIRUS REPLICATION, 5047*
  - PHOSPHOTRANSFERASES
    - VIRUS REPLICATION, 5047*
  - POLY C
    - RNA POLYMERASE, 5044*
  - REVERSE TRANSCRIPTASE
    - DIAGNOSIS AND PROGNOSIS, 5352
  - RNA POLYMERASE
    - DIAGNOSIS AND PROGNOSIS, 5352
  - SPLEEN
    - METHYLTRANSFERASES, 5047*
    - PHOSPHOTRANSFERASES, 5047*

- VIRUS, FRIEND SPLEEN FOCUS-FORMING
  - GENETICS
    - IMMUNE RESPONSE, 5043*
    - VIRUS REPLICATION, 5043*
  - NEOPLASM TRANSPLANTATION
    - GENETICS, 5043*
    - IMMUNE RESPONSE, 5043*
    - VIRUS REPLICATION, 5043*

- VIRUS, GARDNER ARNSTEIN FELINE SARCOMA
  - AGE FACTORS
    - ANTIBODIES, VIRAL, 5002
  - VIRAL VACCINES
    - IMMUNITY, PASSIVE, 5002

- VIRUS, GIBBON APE LEUKEMIA
  - LEUKEMIA, MYELOCYTIC
    - DNA-RNA HYBRIDIZATION, 4865*
    - HORIZONTAL TRANSMISSION, 4865*
    - REVERSE TRANSCRIPTASE, 4865*
    - VIRUS-LIKE PARTICLES, 4865*

- VIRUS, GIBBON APE LYMPHOMA
  - LEUKEMIA, LYMPHOBLASTIC
    - ANTIGENIC DETERMINANTS, 5138*
  - LEUKEMIA, MYELOBLASTIC
    - ANTIGENIC DETERMINANTS, 5138*

- VIRUS, GRAFFI MURINE LEUKEMIA
  - LEUKEMIA
    - IMMUNE RESPONSE, MOUSE, 4999
    - IMMUNOGLOBULINS, SURFACE, 4999
    - T-LYMPHOCYTES, 4999

- VIRUS, HELPER
  - VIRUS, KIRSTEN MURINE SARCOMA
    - ANTIGENIC DETERMINANTS, 5056*
    - DEXAMETHASONE, 5056*
    - ISOLATION AND CHARACTERIZATION, 5056*
    - VIRUS REPLICATION, 5056*
  - VIRUS, MURINE LEUKEMIA
    - VIRAL COMPONENTS, REVIEW, 5051*

- VIRUS, HEP-2
  - CARCINOMA
    - ANTIBODY SPECIFICITY, 5009
    - ANTIGENS, VIRAL, 5009

- VIRUS, HERPES
  - PULMONARY ADEMOMATOSIS, OVINE
    - VIRUS REPLICATION, 5062*
  - PULMONARY ADENOMATOSIS, OVINE
    - ANTIBODIES, VIRAL, 5062*
    - VIRUS-LIKE PARTICLES, 5062*

- VIRUS, HERPES SAIMIRI
  - ANTIGENS, VIRAL
    - LYMPHOCYTE TRANSFORMATION, 5015
  - CELL TRANSFORMATION, NEOPLASTIC
    - IMMUNE RESPONSE, 5015
  - IMMUNE SERUMS
    - LYMPHOCYTES, 5016
    - PLANT AGGLUTININS, 5016
  - LYMPHOCYTES
    - CELL TRANSFORMATION, NEOPLASTIC, 5014
  - T-LYMPHOCYTES
    - VIRUS REPLICATION, 5073*
  - LYMPHOMA
    - IMMUNE SERUMS, 5016
  - PLANT AGGLUTININS
    - LYMPHOCYTE TRANSFORMATION, 5015
  - VIRUS REPLICATION
    - ANTIGEN-ANTIBODY REACTIONS, 5014

- VIRUS, HERPES SIMPLEX
  - DNA, CIRCULAR
    - DNA REPLICATION, 5086*
    - ISOLATION AND CHARACTERIZATION, 5086*
    - NUCLEIC ACID DENATURATION, 5086*
    - ULTRASTRUCTURAL STUDY, 5086*
  - GANGLIA
    - VIRUS REPLICATION, 4867*
  - NEURONS
    - VIRUS REPLICATION, 4867*
  - PNEUMONIA
    - VIRUS REPLICATION, 4867*
  - ULTRAVIOLET RAYS
    - VIRUS REPLICATION, 5017
  - UTERINE NEOPLASMS
    - IMMUNE SERUMS, 5020

- VIRUS, HERPES SIMPLEX 1
  - ANTIBODIES, VIRAL
    - ANTIBODY SPECIFICITY, 5095
  - ANTIGENS, VIRAL
    - CELL TRANSFORMATION, NEOPLASTIC, 5087*
    - URIDINE, 2'-DEOXY-5-IODO-, 5087*
  - ENDONUCLEASES
    - DNA, VIRAL, 5082*
  - HYDROGEN PEROXIDE
    - VIRUS REPLICATION, 5018
  - TRANSPLANTATION
    - CELL SURVIVAL, 5117*
  - ULTRAVIOLET RAYS
    - IMMUNE RESPONSE, 5095
  - VIRUS, HERPES SIMPLEX 2
    - ANTIBODIES, VIRAL, 5019
    - ANTIGENS, VIRAL, 5019
    - IMMUNE RESPONSE, 5019

- VIRUS, HERPES SIMPLEX 2
  - ACRIDINE, 3,6-DIAMINO-
    - CELL TRANSFORMATION, NEOPLASTIC, 5089*
    - LIGHT, 5089*
  - ANTIBODIES, VIRAL
    - ANTIBODY SPECIFICITY, 5095
  - CELL TRANSFORMATION, NEOPLASTIC
    - ANTIGENS, VIRAL, 5089*
  - CERVIX NEOPLASMS
    - ANTIBODIES, VIRAL, 4825
    - ANTIGENIC DETERMINANTS, 5088*
    - ANTIGENS, NEOPLASM, 5088*
    - ANTIGENS, VIRAL, 4825
    - CARCINOGENIC POTENTIAL, REVIEW, 4824
    - EPIDEMIOLOGY, 4825
    - EPIDEMIOLOGY, REVIEW, 4822
    - SARCOMA, 5088*
    - VENEREAL DISEASES, 4825
  - ENDONUCLEASES
    - DNA, VIRAL, 5082*
  - FIBROSARCOMA
    - ANTIGENS, VIRAL, 5089*
    - RADIATION, NON-IONIZING, 5089*
    - VIRUS INACTIVATION, PHOTODYNAMIC, 5089*
  - HYDROGEN PEROXIDE
    - VIRUS REPLICATION, 5018
  - IMMUNIZATION
    - NEOPLASM METASTASIS, 5117*
  - LIGHT
    - CELL TRANSFORMATION, NEOPLASTIC, 5089*
  - PROSTATIC NEOPLASMS
    - CELL TRANSFORMATION, NEOPLASTIC, 5022
  - RADIATION, NON-IONIZING
    - ACRIDINE, 3,6-DIAMINO-, 5089*

- SARCOMA
    - ANTIGENIC DETERMINANTS, 5088*
    - ANTIGENS, NEOPLASM, 5088*
- TESTICULAR NEOPLASMS
    - ANTIGENS, VIRAL, 5022
    - PRECANCEROUS CONDITIONS, 5022
- TRANSPLANTATION
    - CELL SURVIVAL, 5117*
- ULTRAVIOLET RAYS
    - CELL SURVIVAL, 5117*
    - IMMUNE RESPONSE, 5095
    - TRANSPLANTATION, 5117*
- VIRUS, HERPES SIMPLEX 1
    - ANTIBODIES, VIRAL, 5019
    - ANTIGENS, VIRAL, 5019
    - IMMUNE RESPONSE, 5019

IRUS, INFLUENZA
- HEMADSORPTION
    - ULTRASTRUCTURAL STUDY, 5037*

IRUS, KIRSTEN MURINE SARCOMA
- DEXAMETHASONE
    - VIRUS, HELPER, 5056*
- HEPATOMA
    - VIRUS REPLICATION, 5056*
- VIRUS, HELPER
    - ANTIGENIC DETERMINANTS, 5056*
    - ISOLATION AND CHARACTERIZATION, 5056*
- VIRUS REPLICATION
    - VIRUS, HELPER, 5056*

IRUS, KIRSTEN MURINE SARCOMA-LEUKEMIA
- ACTINOMYCIN D
    - VIRUS REPLICATION, 5001
- CYTOCHALASIN B
    - VIRUS REPLICATION, 5001
- VINCALEUKOBLASTINE, SULFATE
    - VIRUS REPLICATION, 5001
- VIRUS REPLICATION
    - CELL CYCLE KINETICS, 5001

IRUS-LIKE PARTICLES
- ANTIGENS, VIRAL
    - REVERSE TRANSCRIPTASE, 5011
- BREAST NEOPLASMS
    - EPIDEMIOLOGY, REVIEW, 4851
- LEUKEMIA, MYELOCYTIC
    - VIRUS, GIBBON APE LEUKEMIA, 4865*
    - VIRUS, RNA TUMOR, 4865*
    - VIRUS, WOOLLY MONKEY SARCOMA, 4865*
- PROSTATIC NEOPLASMS
    - EPITHELIAL CELLS, 5021
- PULMONARY ADENOMATOSIS, OVINE
    - ISOLATION AND CHARACTERIZATION, 5062*
    - VIRUS, HERPES, 5062*

IRUS, MAREK'S DISEASE HERPES
- ANTIGENS, VIRAL
    - IMMUNE RESPONSE, FEATHER FOLLICLES, 4988
- LYMPHOCYTES
    - IMMUNE RESPONSE, 4989
- B-LYMPHOCYTES
    - VIRUS REPLICATION, 5107
- T-LYMPHOCYTES
    - VIRUS REPLICATION, 5107
- LYMPHOMA
    - ANTIBODIES, VIRAL, 4988
    - ANTIGENS, VIRAL, 4988
    - IMMUNE RESPONSE, 4989
    - B-LYMPHOCYTES, 5107
    - T-LYMPHOCYTES, 5107
    - VIRUS REPLICATION, 4989

VIRUS, MASON-PFIZER MONKEY
- CARCINOMA
    - ANTIBODY SPECIFICITY, 5009
    - ANTIGENS, VIRAL, 5009

VIRUS, MENGO
- ETHANOL, 2-MERCAPTO-
    - VIRAL PROTEINS, 5030
- L CELLS
    - VIRAL PROTEINS, 5030
- THREITOL, 1,4-DITHIO-
    - VIRAL PROTEINS, 5030
- ZINC CHLORIDE
    - VIRAL PROTEINS, 5030

VIRUS, MOLONEY MURINE LEUKEMIA
- ACTINOMYCIN D
    - VIRUS REPLICATION, 5048*
- CYCLOHEXIMIDE
    - VIRUS REPLICATION, 5048*
- VIRUS REPLICATION
    - CELL CYCLE KINETICS, 5048*
    - ULTRASTRUCTURAL STUDY, 5048*

VIRUS, MOLONEY MURINE SARCOMA
- CELL TRANSFORMATION, NEOPLASTIC
    - ANTIGENIC DETERMINANTS, 5059*
- PARTICLE SIZE
    - RAT-ADAPTED VIRUS, 5058*
- PEPTIDES
    - CELL TRANSFORMATION, NEOPLASTIC, 5059*
    - ISOLATION AND CHARACTERIZATION, 5059*
- SARCOMA, OSTEOGENIC
    - ANTIGENS, NEOPLASM, 5114*
    - CYTOTOXICITY TESTS, IMMUNOLOGIC, 5114*
    - IMMUNE SERUMS, 5114*
    - VIRUS REPLICATION, RAT TUMOR, 5058*
- VIRUS, MURINE LEUKEMIA
    - ANTIGENIC DETERMINANTS, 5059*
    - IMMUNE RESPONSE, 5057*
    - VIRAL INTERFERENCE, 5057*

VIRUS, MURINE LEUKEMIA
- ANTIGEN-ANTIBODY REACTIONS
    - EMBRYO, PREIMPLANTSTION, 5052*
- ANTIGENIC DETERMINANTS
    - EMBRYO, PREIMPLANTSTION, 5052*
- CELL MEMBRANE
    - VIRUS REPLICATION, 5053*
- CHROMOSOMES
    - VIRUS REPLICATION, 5049*
- ERYTHROLEUKEMIA
    - HEMATOPOIETIC STEM CELLS, 5046*
- HEMATOPOIETIC STEM CELLS
    - CELL TRANSFORMATION, NEOPLASTIC, 5046*

    - TRANSPLANTATION IMMUNOLOGY, 5046*
  - HYBRID CELLS
    - VIRUS REPLICATION, 5049*
  - LEUCINE
    - CELL TRANSFORMATION, NEOPLASTIC, 5054*
    - METABOLISM, 5054*
  - LEUKEMIA
    - IMMUNE RESPONSE, MOUSE, 4999
    - IMMUNOGLOBULINS, SURFACE, 4999
    - T-LYMPHOCYTES, 4999
  - LYMPHOCYTE TRANSFORMATION
    - VIRAL COMPONENTS, REVIEW, 5051*
  - RADIATION
    - VIRUS REPLICATION, 4979*
  - TRANSPLANTATION, AUTOLOGOUS
    - HISTOLOGICAL STUDY, SPLEEN, 5046*
  - VIRAL PROTEINS
    - HYBRID CELLS, 5071*
  - VIRUS, HELPER
    - VIRAL COMPONENTS, REVIEW, 5051*
  - VIRUS, MOLONEY MURINE SARCOMA
    - ANTIGENIC DETERMINANTS, 5059*
    - IMMUNE RESPONSE, 5057*
    - VIRAL INTERFERENCE, 5057*

- VIRUS, MURINE MAMMARY TUMOR
  - BREAST NEOPLASMS
    - ANTIGENS, NEOPLASM, 4828
    - ANTIGENS, VIRAL, 4828
    - VIRUS, B-TYPE RNA TUMOR, 4828
  - DNA NUCLEOTIDYLTRANSFERASES
    - DNA REPLICATION, 5064*
    - ISOLATION AND CHARACTERIZATION, 5064*
  - TRYPSIN
    - ANTIGENS, VIRAL, 5066*
    - GLYCOPROTEINS, 5066*
  - VIRAL PROTEINS
    - A-TYPE PARTICLES, 5065*
    - ISOLATION AND CHARACTERIZATION, 5065*

- VIRUS, MURINE SARCOMA
  - ANTIGENS, VIRAL
    - ANTIGENIC DETERMINANTS, REVIEW, 4869*
  - BENZOIC ACID, GUANIDINONITROPHENYL-
    - PEPTIDE HYDROLASES, 5007
  - CELL ADHESION
    - CELL TRANSFORMATION, NEOPLASTIC, 5055*
    - ULTRASTRUCTURAL STUDY, 5055*
  - HISTOCOMPATIBILITY ANTIGENS
    - ANTIGENIC DETERMINANTS, REVIEW, 4869*
  - IMMUNITY, CELLULAR
    - ANTIGENIC DETERMINANTS, REVIEW, 4869*
  - LEUCINE
    - CELL TRANSFORMATION, NEOPLASTIC, 5054*
    - METABOLISM, 5054*
  - PEPTIDE HYDROLASES
    - CELL TRANSFORMATION, NEOPLASTIC, 5007

- VIRUS, MYCOPLASMA
  - DNA REPLICATION
    - VIRUS REPLICATION, 5029
  - RIFAMPICIN
    - ACHOLEPLASMA LAIDLAWII, 5029
    - DNA REPLICATION, 5029
    - VIRUS REPLICATION, 5029

- VIRUS, N-TROPIC MURINE LEUKEMIA
  - VIRUS REPLICATION
    - HYBRID CELLS, 5000

- VIRUS, PAPOVA
  - LEUKOENCEPHALOPATHY, PROGRESSIVE MULTIFOCAL
    - ISOLATION AND CHARACTERIZATION, REVIEW, 4827
  - LYMPHOMA
    - CELL TRANSFORMATION, NEOPLASTIC, 4995
  - PINEALOMA
    - ULTRASTRUCTURAL STUDY, 5078*
  - SARCOMA
    - CELL TRANSFORMATION, NEOPLASTIC, 4995
    - NEOPLASM TRANSPLANTATION, 4995

- VIRUS, POLYOMA
  - ACTINOMYCIN D
    - CARBOXY-LYASES, 5074*
    - RNA REPLICATION, 5074*
  - CARBOXY-LYASES
    - DNA REPLICATION, 5074*
    - RNA REPLICATION, 5074*
  - CELL ADHESION
    - CELL TRANSFORMATION, NEOPLASTIC, 5077*
  - CELL MEMBRANE
    - CELL TRANSFORMATION, NEOPLASTIC, 5077*
  - CELL TRANSFORMATION, NEOPLASTIC
    - DNA, VIRAL, 5076*
    - TEMPERATURE SENSITIVE MUTANTS, 5076*
  - CYCLOHEXIMIDE
    - CARBOXY-LYASES, 5074*
  - DNA, CIRCULAR
    - DNA-DNA HYBRIDIZATION, 5012
  - DNA REPLICATION
    - DNA, 5012
  - DNA, VIRAL
    - TEMPERATURE SENSITIVE MUTANTS, 5076*
    - VIRUS REPLICATION, 5076*
  - POLYAMINES
    - DNA REPLICATION, 5074*
    - RNA REPLICATION, 5074*
  - RNA, MESSENGER
    - ISOLATION AND IDENTIFICATION, 5075*
    - VIRUS REPLICATION, 5075*
  - RNA, VIRAL
    - ISOLATION AND IDENTIFICATION, 5075*
    - VIRUS REPLICATION, 5075*

- VIRUS, POLYOMA, BK
  - IMMUNOLOGIC DEFICIENCY SYNDROMES
    - ISOLATION AND CHARACTERIZATION, REVIEW, 4827
  - IMMUNOSUPPRESSION

    - ISOLATION AND CHARACTERIZATION, REVIEW, 4827

- VIRUS, RAUSCHER MURINE LEUKEMIA
  - DNA NUCLEOTIDYLTRANSFERASES
    - REVERSE TRANSCRIPTASE, 4996
  - LEUKEMIA
    - IMMUNE RESPONSE, MOUSE, 4999
    - IMMUNOGLOBULINS, SURFACE, 4999
    - T-LYMPHOCYTES, 4999
  - METHYLTRANSFERASES
    - VIRUS REPLICATION, 5047*
  - PHOSPHOTRANSFERASES
    - VIRUS REPLICATION, 5047*
  - REVERSE TRANSCRIPTASE
    - TEMPERATURE SENSITIVE MUTANTS, 4996
  - SPLEEN
    - METHYLTRANSFERASES, 5047*
    - PHOSPHOTRANSFERASES, 5047*
  - VIRUS, BOVINE LEUKEMIA
    - DNA-RNA HYBRIDIZATION, 5004

- VIRUS, RD-114
  - ANTIGENS, VIRAL
    - REVERSE TRANSCRIPTASE, 5011
  - RNA, VIRAL
    - ULTRASTRUCTURAL STUDY, 5033

- VIRUS REPLICATION
  - COLONIC NEOPLASMS
    - CELLS, CULTURED, 5235*
  - HEPATOMA
    - VIRUS, KIRSTEN MURINE SARCOMA, 5056*
  - LYMPHOMA
    - VIRUS, MAREK'S DISEASE HERPES, 4989
  - LYMPHOSARCOMA
    - VIRUS, C-TYPE RNA TUMOR, 5032
  - NASOPHARYNGEAL NEOPLASMS
    - EPITHELIAL CELLS, 5090*
    - VIRUS, EPSTEIN-BARR, 5090*
  - PULMONARY ADENOMATOSIS, OVINE
    - VIRUS, HERPES, 5062*
  - VIRUS, ADENO 1
    - NUCLEOPROTEINS, 5080*
  - VIRUS, ADENO 5
    - RNA, MESSENGER, 5085*
  - VIRUS, B-TROPIC MURINE LEUKEMIA
    - HYBRID CELLS, 5000
  - VIRUS, BOVINE LEUKEMIA
    - CELLS, CULTURED, 5003
  - VIRUS, EPSTEIN-BARR
    - IMMUNE RESPONSE, REVIEW, 4826
  - VIRUS, FRIEND MURINE LEUKEMIA
    - METHYLTRANSFERASES, 5047*
    - PHOSPHOTRANSFERASES, 5047*
  - VIRUS, FRIEND SPLEEN FOCUS-FORMING
    - GENETICS, 5043*
    - NEOPLASM TRANSPLANTATION, 5043*
  - VIRUS, HERPES SAIMIRI
    - ANTIGEN-ANTIBODY REACTIONS, 5014
    - T-LYMPHOCYTES, 5073*
  - VIRUS, HERPES SIMPLEX
    - GANGLIA, 4867*
    - NEURONS, 4867*
    - PNEUMONIA, 4867*
    - ULTRAVIOLET RAYS, 5017
  - VIRUS, HERPES SIMPLEX 1
    - HYDROGEN PEROXIDE, 5018
  - VIRUS, HERPES SIMPLEX 2
    - HYDROGEN PEROXIDE, 5018
  - VIRUS, KIRSTEN MURINE SARCOMA
    - VIRUS, HELPER, 5056*
  - VIRUS, KIRSTEN MURINE SARCOMA-LEUKEMIA
    - ACTINOMYCIN D, 5001
    - CELL CYCLE KINETICS, 5001
    - CYTOCHALASIN B, 5001
    - VINCALEUKOBLASTINE, SULFATE, 5001
  - VIRUS, MAREK'S DISEASE HERPES
    - B-LYMPHOCYTES, 5107
    - T-LYMPHOCYTES, 5107
  - VIRUS, MOLONEY MURINE LEUKEMIA
    - ACTINOMYCIN D, 5048*
    - CELL CYCLE KINETICS, 5048*
    - CYCLOHEXIMIDE, 5048*
    - ULTRASTRUCTURAL STUDY, 5048*
  - VIRUS, MURINE LEUKEMIA
    - CELL MEMBRANE, 5053*
    - CHROMOSOMES, 5049*
    - HYBRID CELLS, 5049*
    - RADIATION, 4979*
  - VIRUS, MYCOPLASMA
    - DNA REPLICATION, 5029
    - RIFAMPICIN, 5029
  - VIRUS, N-TROPIC MURINE LEUKEMIA
    - HYBRID CELLS, 5000
  - VIRUS, POLYOMA
    - DNA, VIRAL, 5076*
    - RNA, MESSENGER, 5075*
    - RNA, VIRAL, 5075*
  - VIRUS, RAUSCHER MURINE LEUKEMIA
    - METHYLTRANSFERASES, 5047*
    - PHOSPHOTRANSFERASES, 5047*
  - VIRUS, ROUS SARCOMA
    - EGG YOLK, 5039*
    - URIDINE, 5-FLUORO-, 4994
  - VIRUS, SV15
    - NUCLEOPROTEINS, 5080*
  - VIRUS, SV40
    - HISTOCOMPATIBILITY ANTIGENS, 5072*

- VIRUS, RETICULOENDOTHELIOSIS
  - SARCOMA
    - ANTIBODIES, NEOPLASM, 5119*
    - IMMUNITY, CELLULAR, 5119*
    - B-LYMPHOCYTES, 5119*

- VIRUS, RHINO
  - HELA CELLS
    - RNA, VIRAL, 5006

- VIRUS, RICKARD FELINE LEUKEMIA
  - VIRAL VACCINES
    - IMMUNITY, PASSIVE, 5002

- VIRUS, RNA TUMOR
  - AGGLUTINATION
    - CELL TRANSFORMATION, NEOPLASTIC, 5035*
  - LEUKEMIA, MYELOCYTIC
    - DNA-RNA HYBRIDIZATION, 4865*
    - REVERSE TRANSCRIPTASE, 4865*
    - VIRUS-LIKE PARTICLES, 4865*
  - PLANT AGGLUTININS
    - BINDING SITES, 5035*

- VIRUS, ROUS SARCOMA
  - DNA, NEOPLASM
    - TRANSFORMATION, GENETIC, 4992
  - DNA NUCLEOTIDYLTRANSFERASES
    - TEMPERATURE SENSITIVE MUTANTS, 4996
  - DNA REPLICATION
    - CELL TRANSFORMATION, NEOPLASTIC, 5036*
    - TEMPERATURE SENSITIVE MUTANTS, 5036*
  - ETHANOL, 2-MERCAPTO-
    - DNA REPLICATION, 5036*
  - GLUCOSE
    - CELL TRANSFORMATION, NEOPLASTIC, 5378*
    - METABOLISM, 5378*
  - GOLGI APPARATUS
    - CELL TRANSFORMATION, NEOPLASTIC, 5050*
  - GROWTH SUBSTANCES
    - CELL TRANSFORMATION, NEOPLASTIC, 4990
    - ISOLATION AND CHARACTERIZATION, 4990
  - MITOCHONDRIA
    - DNA NUCLEOTIDYLTRANSFERASES, 4993
    - DNA REPLICATION, 5036*
    - REVERSE TRANSCRIPTASE, 4993
  - PEPTIDE HYDROLASES
    - ACTINOMYCIN, 4991
    - CYCLOHEXIMIDE, 4991
    - TEMPERATURE SENSITIVE MUTANTS, 4991
    - TUBERCIDIN, 5-BROMO-, 4991
  - PLASMINOGEN ACTIVATORS
    - CELL TRANSFORMATION, NEOPLASTIC, 5038*
    - INTRACELLULAR DISTRIBUTION, 5038*
  - PROTEINS
    - CELL TRANSFORMATION, NEOPLASTIC, 5040*
    - TEMPERATURE SENSITIVE MUTANTS, 5040*
  - REVERSE TRANSCRIPTASE
    - TEMPERATURE SENSITIVE MUTANTS, 4996
  - RNA REPLICATION
    - CELL TRANSFORMATION, NEOPLASTIC, 4994
  - RNA, VIRAL
    - HEAT DISSOCIATION, 5041*
    - ULTRASTRUCTURAL STUDY, 5033, 5041*
  - SARCOMA
    - DNA NUCLEOTIDYLTRANSFERASES, 4993
    - REVERSE TRANSCRIPTASE, 4993
  - TRACHEA
    - ULTRASTRUCTURAL STUDY, 5037*
  - TRANSFORMATION, GENETIC
    - ADENYL CYCLASE, 5042*
    - CELL TRANSFORMATION, NEOPLASTIC, 5042*
    - TEMPERATURE SENSITIVE MUTANTS, 5042*
  - URIDINE, 5-FLUORO-
    - RNA REPLICATION, 4994
    - VIRUS REPLICATION, 4994
  - VIRUS REPLICATION
    - EGG YOLK, 5039*

- VIRUS, ROWSON-PARR MURINE LEUKEMIA
  - B-LYMPHOCYTES
    - IMMUNE RESPONSE, MOUSE, 5108
    - IMMUNOSUPPRESSION, 5108
  - T-LYMPHOCYTES
    - IMMUNE RESPONSE, MOUSE, 5108
    - IMMUNOSUPPRESSION, 5108
  - MACROPHAGES
    - IMMUNE RESPONSE, MOUSE, 5108
    - IMMUNOSUPPRESSION, 5108

- VIRUS, SENDAI
  - LEUKEMIA, MYELOCYTIC
    - INTERFERON, 5109

- VIRUS, SIMIAN SARCOMA
  - ANTIGENS, VIRAL
    - REVERSE TRANSCRIPTASE, 5011
  - ANTINEOPLASTIC AGENTS
    - REVERSE TRANSCRIPTASE, 5034
  - VIRAL PROTEINS
    - ANTIGENIC DETERMINANTS, 5060*
    - ISOLATION AND CHARACTERIZATION, 5060*

- VIRUS, SV15
  - DNA, SINGLE-STRANDED
    - NUCLEOPROTEINS, 5080*
  - DNA, VIRAL
    - NUCLEOPROTEINS, 5080*
  - NUCLEOPROTEINS
    - VIRUS REPLICATION, 5080*

- VIRUS, SV40
  - CELL MEMBRANE
    - LIPIDS, 5068*
  - CELL TRANSFORMATION, NEOPLASTIC
    - KIDNEY, DOG, 5068*
  - CHROMOSOMES, HUMAN, 6-12
    - HYBRID CELLS, 5071*
  - DNA, CIRCULAR
    - DNA-DNA HYBRIDIZATION, 5012
  - DNA REPLICATION
    - CELL TRANSFORMATION, NEOPLASTIC, 5393*
    - DNA, 5012
  - DNA, VIRAL
    - ENDONUCLEASES, 5008
    - TEMPERATURE SENSITIVE MUTANTS, 5008
  - FIBROSARCOMA
    - BRADYKININ, 5067*
    - CARBOXY-LYASES, 5067*
  - GLYCOLYSIS
    - CELL TRANSFORMATION, NEOPLASTIC, 5343
  - HISTOCOMPATIBILITY ANTIGENS
    - CELL TRANSFORMATION, NEOPLASTIC, 5072*
    - IMMUNITY, CELLULAR, 5072*
    - VIRUS REPLICATION, 5072*
  - LESCH-NYHAN SYNDROME
    - CELL TRANSFORMATION, NEOPLASTIC, 5071*
    - CHROMOSOMES, HUMAN, 6-12, 5071*
  - LIPIDS
    - KIDNEY, DOG, 5068*
  - MACROPHAGES

        CELL TRANSFORMATION, NEOPLASTIC, 5098
        RECEPTORS, IMMUNOGLOBULINS, FC, 5098
    NAD
        CELL DIVISION, 5070*
        CELL TRANSFORMATION, NEOPLASTIC, 5070*
    NADP
        CELL TRANSFORMATION, NEOPLASTIC, 5070*
    NERVOUS SYSTEM NEOPLASMS
        TERATOGENS, 5013
        TRANSPLACENTAL CARCINOGENESIS, RAT, 5013
    PLASMINOGEN ACTIVATOR
        AGGLUTINATION, 5069*
        CELL TRANSFORMATION, NEOPLASTIC, 5038*, 5069*
        CONCANAVALIN A, 5069*
    PROTEINS
        CELL TRANSFORMATION, NEOPLASTIC, 5393*
    VIRAL PROTEINS
        HYBRID CELLS, 5071*

VIRUS, SYNDER-THEILEN FELINE SARCOMA
    ANTIGENS, VIRAL
        IMMUNE RESPONSE, 5002
    VIRAL VACCINES
        IMMUNITY, PASSIVE, 5002

VIRUS, VERTEBRATE
    LEUKEMIA
        EPIDEMIOLOGY, REVIEW, 4836
        TRANSMISSION, REVIEW, 4836

VIRUS, WOOLLY MONKEY SARCOMA
    LEUKEMIA, MYELOCYTIC
        DNA-RNA HYBRIDIZATION, 4865*
        HORIZONTAL TRANSMISSION, 4865*
        REVERSE TRANSCRIPTASE, 4865*
        VIRUS-LIKE PARTICLES, 4865*

WATER POLLUTANTS
    CARCINOGEN, CHEMICAL
        AMES TEST, 4928*
    MUTAGENS
        AMES TEST, 4928*

WOUND HEALING
    EPITHELIAL CELLS
        FREEZING, 4970

XANTHINE, 3-ISOBUTYL-1-METHYL-
    MELANOMA
        ADENOSINE CYCLIC 3:5: MONOPHOSPHATE, 5388*

XENOPUS LAEVIS
    AFLATOXIN B1
        SELENIOUS ACID, DISODIUM SALT, 4947*

XERODERMA PIGMENTOSUM
    DNA REPAIR
        CASE REPORT, 5159
    GENETICS
        CASE REPORT, 5159
    ULTRAVIOLET RAYS
        DNA REPAIR, 5159

ZINC
    LEUKEMIA, LYMPHOCYTIC
        LEUKOCYTES, 5259*
    LEUKEMIA, MONOBLASTIC
        LEUKOCYTES, 5259*

ZINC CHLORIDE
    VIRUS, MENGO
        VIRAL PROTEINS, 5030

CHEMICAL ABSTRACT SERVICES REGISTRY NUMBER INDEX

CAS REGISTRY NUMBER	ABSTRACT NUMBER
50022	5357, 5358
50066	4887, 4899, 4912
50099	4905
50180	4880
50237	4987, 5110
50282	4886, 5360
50293	4885, 4890
50328	4901, 4903, 4904, 4905, 4906, 4907, 4908, 4909, 5287
50419	5168
50555	5274
50760	4897, 4991, 5001
50817	5345
51752	4883
51796	5105
52017	4912
53703	5287
53792	5109
53963	4805, 4815, 4888
54115	4902
55174	4924
55185	4896, 4897, 4899
56291	4905
56495	4830, 4899, 4900, 4901, 4904, 4911, 4912, 4987, 5211
56531	5175
56553	4903, 5287
56575	4880, 4883, 4919
57114	5342
57147	4899
57410	4913
57830	4848, 4854, 4886
57885	4901, 5184, 5358
57965	4923
57976	4904, 4910, 5360
58082	5282
58151	4909
59143	4882, 4997
59892	4917
59927	5156
60117	4891
60242	5030
60355	4889, 4890
60515	4801

CHEMICAL ABSTRACT SERVICES REGISTRY NUMBER INDEX

CAS REGISTRY NUMBER	ABSTRACT NUMBER
61905	4924
62442	4905
62533	4912
62555	4889
62680	4887
62737	4801
62759	4880, 4895, 4899
63843	5156
64197	4998
64675	4882
64868	4923
66273	4880
66819	4991, 5109, 5347, 5357
67210	4924
67641	4802
67685	4802, 4998, 5349, 5350
68122	4899
68268	4885, 4890
68940	4918
70257	4880, 4882, 4883, 4916, 4918, 4919, 4920, 4921
71432	4912
74793	5347
75014	5191, 5192, 5193
75752	4882
77781	4922
79016	4887
85018	5287
91203	4912
91598	4815
94586	4807
94597	4807
99569	4883
100414	4912
106934	4814
107062	4814
107073	4814
120127	4901, 5287
120581	4807
121697	4899
127173	5345
129000	5287
134587	4918
141662	4801
143679	5001
191071	5287

CHEMICAL ABSTRACT SERVICES REGISTRY NUMBER INDEX

CAS REGISTRY NUMBER ABSTRACT NUMBER

191242........................ 5287

191264........................ 5287

206440........................ 5287

218019........................ 4903, 5287

298000........................ 4801

301122........................ 4801

303344........................ 4808

306376........................ 4915

316461........................ 4994

452062........................ 4882

471147........................ 4806

480546........................ 4810

494382........................ 4897

494973........................ 4902

521186........................ 4886

540738........................ 4895, 4914

543384........................ 5347

547046........................ 4810

592621........................ 5183

604591........................ 4887

613138........................ 4830

614006........................ 4899

CAS REGISTRY NUMBER ABSTRACT NUMBER

621647........................ 4899

642659........................ 4888

684935........................ 4894

700061........................ 4905

758963........................ 4899

759739........................ 4893

760792........................ 4899

771517........................ 4905

1069096........................ 4881

1162658........................ 4811, 4883

1197188........................ 5211

1239458........................ 4814, 4883

1309360........................ 4927

1314201........................ 4961

1332214........................ 4884, 5285, 5286

1401554........................ 4809

1402386........................ 4991

1406162........................ 4885

1415721........................ 5109

1968054........................ 4905

2465272........................ 4883

2541697........................ 4911

CHEMICAL ABSTRACT SERVICES REGISTRY NUMBER INDEX

CAS REGISTRY NUMBER	ABSTRACT NUMBER
2949920	5336
3083236	4888
3105973	4880
3688537	4814
4245776	4916
6046931	4924
6098448	4815
6882015	4804
7227910	4895
7292526	4883
7439896	4925, 4926, 4927
7439921	4961
7440019	4882
7440020	4927
7440075	4960
7440144	4961, 4962
7440291	4961
7440371	4882
7440382	4813
7440597	4882
7646857	5030
7647010	5156
7647145	4806
7681825	5183
7722841	5018
7727379	4882, 4970
7727437	4921
8001216	4922
8001589	4817
8063943	5284
9002077	5092, 5338
9002624	4910
9002862	5284
9004108	4987, 5347
10028178	4959
10048132	4802
10595956	4895
12001284	4884, 5285, 5286
12001295	4884, 5285, 5286
12035722	4927
12172735	4884, 5285, 5286
13292461	5029
14797650	4902

CHEMICAL ABSTRACT SERVICES REGISTRY NUMBER INDEX

CAS REGISTRY NUMBER	ABSTRACT NUMBER	CAS REGISTRY NUMBER	ABSTRACT NUMBER
4901087	5183		
5176291	5384		
6096972	5030		
6561298	4904		
6812547	4927		
7068789	4884, 5285, 5286		
1193806	4991		
4554265	4892		
4928174	4904		
6241634	4905		
1005024	4905		

LN ABSTRACT NUMBER

AS 4813

FE 4925, 4926, 4927

NA..G 4806

NA..I 5183

NI 4927

NI3.S2 4927

N2 .... 4882, 4970

PB 4961

PU 4960

RA 4961, 4962

TH 4961

TH..O2 4961

ZN..G2 5030

ZE 4814

H 5156

XGGG YR DG&R DG 4885, 4890

YGU1G 4887

YGU1OPO&O1&O1 4801

YR&UYR&R DO2N2&2 &QV1XQVQ 1VQ 5168

1U1 .... 5191, 5192, 5193

2G 4814

WLN ABSTRACT NUMBER

G2N1&2G 4883

IN1&R 4899

L B656 HHJ EMV1 .... 4805, 4815, 4888

L B656 HHJ ENO 4883

L B656 HHJ ENV1&V1 4888

L B666J 5287

L B677 MV&T&J CO1 DO1 EO1 JMV1 NO1 4923

L C6566 1A PJ 5287

L C666J 4901, 5287

L C666J EZ 4830

L D6 B666J 4903, 5287

L D6 B666J C J 4904, 4910, 5360

L D6 B666J J 4911

L D6 B6666 2AB TJ 4901, 4903, 4904, 4905, 4906, 4907, 4908, 4909, 5287

L E3 B675 MV IU NUTJ BQ CL DQ EQ F1 F1 J1Q LQ N1 4905

L E5 B666 LUTJ A E FY&3Y OQ -B&AEFO ... 4901, 5184, 5358

L E5 B666 OV MUTJ A CQ E FV1Q FQ -B&ACEF 4987, 5110

L E5 B666 OV MUTJ A E FV1 -B&AEF 4848, 4854, 4886

L E5 B666TTT&J E FQ OQ 4886, 5360

WLN	ABSTRACT NUMBER
L E6 B666J	4903, 5287
L E6 D6656 1A T&&T&J R	4830, 4899, 4900, 4901, 4904, 4911, 4912, 4987, 5211
L G6 D6 B666J	5287
L6TJ AVQ D1Z -T	5211
L6UTJ A BL/U1Y&U2/ 2Q C C -T	4885, 4890
L66J	4912
L66J CZ	4815
L666 B6 2AB PJ	5287
ONN1&R	4899
ONN1&1	4880, 4895, 4899
ONN2&2	4896, 4897, 4899
ONN3&3	4899
ON1&UN1OV1	5183
OS1&1	4802, 4998, 5349 5350
OS2&2SPO&O1&O1	4801
OV1 &OV1 &-CU- &QH	4924
QR DY2& 2U	5175
QVYZ1R CQ DQ -DL	5156
QVYZ1R CQ DQ -L	5156
QVYZ1Y -L	4924
QVYZ2S2	4924
QVYZ2S2 -DL	4924
QV1	4998
QV17	5342
Q2G	4814
R	4912
SH2Q	5030
T C6 B65-24- A D E 2BC G& AV LO NO F&VM OU B&U D&U MH&&&TJ DQ GQ IQ J M	5029
T C666 BNJ EN1&1 MN1&1	4897
T C666 BO EV INJ D FZ N G- K-/VM-OT5-16- AN FVN IVN LVO PVM SVTJ G J KY N RY 2	4897, 4991, 5001
T E6 C6 B655 DO KV PO RO SU&&&TTJ IQ MO1	4802
T F5 C6 B655 DOV GV OO QO RUT&&TTJ LO1	4811, 4883
T F6 D5 C666 EM ON&&TTTJ HO1 SOVR CO1 DO1 EO1& TO1 UVO1	5274
T5MVMV EHJ ER& ER	4913
T5NNVJ A BR& DN1&1 E	4909
T5OJ BNW E- ET5N CSJ BMVH	4892
T5OJ BWZU1- BT5OJ ENW	4814
T5OV EHJ CQ DQ EYQ1Q	5345

WLN	ABSTRACT NUMBER
T5VNNV EHJ BR& CR& E2SO&R	4923
T55 AN CUTJ D1OVXQXQ &&YO1 FOVYU2	4808
T55-12- 1A Q EK IOVY OVO BUTJ EO KU2 M NQ N1Q	4810
T55-12-1A Q EN IOVY OVO BUTJ KU2 M NQ N1Q	4810
T56 BN DM FVM INJ	4918
T56 BN DN FN HNJ IN1&1 D- BT5OTJ CQ DMVYZ1R DO1& E1Q	5109
56 BN DN FNVNVJ B F H	5282
56 BO DO CHJ G1U2	4807
56 BO DO CHJ G2U1	4807
56 BO DO CHJ G3	4807
6MPOTJ BO BN2G2G	4880
6N DOTJ ANO	4917
5NJ C- BT5MTJ -DL	4902
5NJ C- BT5NTJ	4902
5NJ C- BT5NTJ ANO	4902
5NVMVJ EE A- ET5OTJ B1Q CQ -A&C	4882, 4997
5OTJ BO1NUNO&1 CQ DQ EQ F1Q-A&D -D	5183
5VMVMV FHJ F2 FR	4887, 4899, 4912
5VMVNV FHJ D F F- AL6UTJ	4905
5VMVNV FHJ D F F- AL6UTJ &-NA-	4905

WLN	ABSTRACT NUMBER
T6VMVTJ E1YQ- BL6VTJ D F	4991, 5109, 5347, 5357
T66 BNJ BO ENW	4880, 4883, 4919
VHN1&1	4899
WNMYUM &N2 &NO	4916
WNMYUM&N1&NO	4880, 4882, 4883, 4916, 4918, 4919, 4920, 4921
WNR DOPS&O1&O1	4801
WSQ1	4882
WS1&O1	4880
ZN1&1	4899
ZR	4912
ZVN1&NO	4894
ZVN2&NO	4893
ZVO2	5105
ZV1R	4889, 4890
ZYUS	4889
1MM1	4895, 4914
1MM1 &GH &GH	4915
1N1&NUNR	4895
1N1&R D- 2YUM &GH	4883
1N1&R DNUNR	4891

WLN	ABSTRACT NUMBER
1OPO&O1&OY&U1VN1&1 -C	4801
1OPS&O1&S1VM1	4801
1OSWO1	4922
1V1	4802
2OR DMV1	4905
2OSWO2	4882
2R	4912
3XR&R&VO2N2&2 &GH	4887

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PREFACE

Carcinogenesis Abstracts is a publication of the National Cancer Institute. The journal serves as a vehicle through which current documentation of carcinogenesis research highlights are compiled, condensed, and disseminated on a regular basis. It represents an integral part of the Institute's program of fostering and supporting coordinated research into cancer etiology. Issues of *Carcinogenesis Abstracts* normally contain three-hundred abstracts and three-hundred citations (unaccompanied by corresponding abstracts). Abstracts and citations refer to the current scientific literature that describes the most significant carcinogenesis research carried on at the National Cancer Institute, other governmental agencies, and private institutions. *Carcinogenesis Abstracts* is intended to be a highly useful current awareness tool for scientists engaged in carcinogenesis research or related areas. The great number and diversity of publications relevant to carcinogenesis make imperative the availability of this service to investigators whose work requires that they keep abreast with current developments in the field.

Carcinogenesis Abstracts is normally published monthly. Volume XIV covers the scientific literature published from Jan 1976 through Dec 1976. To increase the usefulness of *Carcinogenesis Abstracts*, Volume XIV, a Wiswesser Line Notation index and a Chemical Abstracts Service Registry Number index have been provided. These indexes reference compounds described in abstracted articles. A cumulative subject, author, CAS Registry Number, and Wiswesser Line Notation index for Volume XIV will be published shortly after the final regular issue.

Carcinogenesis Abstracts is available free of charge to libraries and to individuals who have a professional interest in carcinogenesis. Requests for *Carcinogenesis Abstracts* from qualified individuals should include statements of their relationship to carcinogenesis research. All correspondence should be addressed as follows.

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NOTE

Journal names are abbreviated according to the list of abbreviations used by *Index Medicus*. For journals not covered by *Index Medicus*, the abbreviations found in *Chemical Abstracts Service Source Index*, 1907-1974 Cumulative, are used. New journals are verified in *New Serial Titles* and abbreviated according to *International Standard ISO 833*. An asterisk indicates the author to address (other than the primary) in requesting reprints.

LANGUAGE ABBREVIATIONS

Afr.	Afrikaans
Ara.	Arabic
Bul.	Bulgarian
Chi.	Chinese
Cro.	Croation
Cze.	Czech
Dan.	Danish
Dut.	Dutch
Eng.	English
Est.	Estonian
Fin.	Finnish
Fle.	Flemish
Fre.	French
Geo.	Georgian
Ger.	German
Gre.	Greek
Heb.	Hebrew
Hun.	Hungarian
Ice.	Icelandic
Ind.	Indonesian
Ita.	Italian
Jpn.	Japanese
Kor.	Korean
Lav.	Latvian
Lit.	Lithuanian
Nor.	Norwegian
Pol.	Polish
Por.	Portuguese
Rum.	Rumanian
Rus.	Russian
Ser.	Serbo-Croatian
Slo.	Slovak
Spa.	Spanish
Swe.	Swedish
Tha.	Thai
Tur.	Turkish
Ukr.	Ukrainian
Vie.	Vietnamese

ABBREVIATIONS USED IN ABSTRACTS

A	angstrom(s)
ACTH	adrenocorticotropic hormone
ADP	adenosine diphosphate
AMP	adenosine monophosphate
ATP	adenosine triphosphate
approx	approximately
av	average
BCG	bacillus Calmette-Guerin
bid	twice daily
C	degree(s) centigrade
cal	calorie(s)
kcal	kilocalorie(s)
cc	cubic centimeter(s)
Ci	curie(s)
mCi	millicurie(s)
µCi	microcurie(s)
cm	centimeter(s)
CNS	central nervous system
cpm	counts per minute
DNA	deoxyribonucleic acid
ED$_{50}$	median effective dose
EDTA	ethylenediamine tetraacetic acid
g	gram(s)
kg	kilogram(s)
mg	milligram(s)
µg	microgram(s)
Hb	hemoglobin
hr	hour(s)
ia	intra-arterial
id	intradermal
ILS	increased life span
im	intramuscular
ip	intraperitoneal
IU	International Unit(s)
iv	intravenous
Km	Michaelis constant
LD	lethal dose
LD$_{50}$	median lethal dose
M	molar
µM	micromolar
mOsm	milliosmolar
max	maximum
mEq	milliequivalent(s)
min	minute(s)
ml	milliliter
µl	microliter(s)
mm	millimeter(s)
mo	month(s)
N	normal concentration
NAD	nicotinamide adenine dinucleotide
NADH	reduced nicotinamide adenine dinucleoti
NADP	nicotinamide adenine dinucleotidephospha
NADPH	reduced nicotinamide adenine dinucleoti phosphate
NCI	National Cancer Institute
NIH	National Institutes of Health
PAS	periodic acid--Schiff
po	orally
ppb	parts per billion
ppm	parts per million
R	roentgen
RBC	red blood cells (erythrocytes)
RNA	ribonucleic acid
rpm	revolutions per minute
sc	subcutaneous
sec	second(s)
SGOT	serum glutamic-oxalacetic transaminase
SGPT	serum glutamic-pyruvic transaminase
soln	solution
TCD	tissue culture dose
TCD$_{50}$	median tissue culture dose
tid	three times daily
UV	ultraviolet
WBC	white blood cells (leukocytes)
wk	week(s)
wt	weight
x	times
yr	year(s)

CONTENTS

	Cross Reference Abbreviations	Abstracts, Citations	Page
REVIEW	(Rev)	5401-5544	839
CHEMICAL CARCINOGENESIS	(Chem)	5545-5619	864
PHYSICAL CARCINOGENESIS	(Phys)	5620-5640	877
VIRAL CARCINOGENESIS	(Viral)	5641-5722	880
IMMUNOLOGY	(Immun)	5723-5776	897
PATHOGENESIS	(Path)	5777-5864	906
EPIDEMIOLOGY AND BIOMETRY	(Epid-Biom)	5865-5901	916
MISCELLANEOUS	(Misc)	5902-6000	923
AUTHOR INDEX			
SUBJECT INDEX			
CHEMICAL ABSTRACT SERVICES REGISTRY NUMBER INDEX			
WISWESSER LINE NOTATION INDEX			

01 CHEMICAL CARCINOGENESIS AND MUTAGENESIS. (Eng.) Bartsch, H.; Grover, P. L. *In: ientific Foundations of Oncology*. Symington, T.; rter, R. L., eds.·(Chicago: William Heinemann dical Books, Ltd.): pp. 334-342; 1976.

e relationships between chemical mutagenesis and rcinogenesis are reviewed. Although not all muta- ns are carcinogens, most chemical carcinogens have en found to be mutagens. The lesions induced by emical mutagens fall into four categories: point tations, that include frame-shift mutations and se-pair substitutions; changes in genetic groupings ransformation); recombination; and chromosome terations due to anaphase lag and nondisjunction. e consequences of DNA repair (or lack of repair) cell survival, mutation, and carcinogenesis are mplex and difficult to assess. Chemical carcino- ns and mutagens must first be activated metabol- ally to reactive electrophilic derivatives (com- unds with electron-deficient atoms) before they ll covalently bind to nucleic acids and other cell nstituents in vivo. The relevance of mutation data om submammalian systems for carcinogenesis in mmals is based on the assumption that the basic inciples of heredity are the same for all living lls. Direct mutagenicity assays have been made ing bacterial viruses, bacteria, yeasts, fungi, d insects. To study mammalian metabolic activation, st-mediated assays using indicator organisms in- cted ip and in vitro mutagenicity assays have been veloped. The specific locus test, extensively used th mice to assess genetic hazards of radiation, is so useful. The initiation of carcinogenesis may sult from at least two mutagenic events, the first which may or may not be inherited. Inadequate owledge of many fundamental cellular processes ecludes the use of the chemical carcinogenesis- tagenesis relationship as proof of the somatic tation hypothesis of cancer. (12 references)

02 THEORIES OF CARCINOGENESIS. (Ger.) Popp, F. A. (Radiologiezentrum d. Universitaet, 50 Marburg, West Germany). *Therapiewoche* 26(6): 0-876; 1976.

ents, characteristics, and current hypotheses of rcinogenesis are reviewed. The paradox that 3,4- nzpyrene and 1,2-benzpyrene are similar physico- emically but the former is carcinogenic and the tter is not is explored. Conversely, many agents ve no common factor except their carcinogenicity. cannot be argued that different agents attack fferent cell mechanisms, since the criteria of rcinogenesis are invariant. All carcinogens must reversibly disturb a common system. Moreover, one iterion of carcinogenesis, additivity of the dose- sponse relation, predicts that the system can be activated; it follows that a biphasic response of itiation and promotion must be involved. Promotion plies a latent period and initiation a target ceptor. The systemic disturbance in the cell re- ires successful division for expression. Accord- gly, different hypotheses, each based on at least e characteristic of carcinogenesis, have been oposed as explanations. The mutational, viral, netic, and immunologic hypotheses are cited; none answers the central question of how cell orientation regulates cell growth. Experiments that underscore the role of cell membrane permeability in carcinogenesis are summarized. In a cell culture, a glass disk but not a quartz disk prevented virus replication from the seeded to the unseeded half of the culture. Further, proliferation of normal cells was arrested by a permeable membrane but resumed when an impermeable membrane was substituted. Malignant cells behaved conversely. (23 references)

5403 HEPATOCARCINOGENESIS BY CHEMICALS. (Eng.) Miller, E. C. (McArdle Lab. Cancer Res., Univ. Wisconsin Medical Center, Madison, WI); Miller, J. A. *Progr Liver Dis* 5: 699-711; 1976.

The mechanism of chemical hepatocarcinogenesis is reviewed. Among the compounds that induce liver tumors are the aromatic amines and amides, halogenated aliphatic and alicyclic compounds, polycyclic aromatic hydrocarbons, alkylnitrosamines and alkylnitrosamides, and aflatoxin B_1. Most hepatic carcinogens can also cause gross and microscopic hepatic changes such as necrosis, cirrhosis, bile ductule cell proliferation, and nodular hyperplasia. The induction of liver tumors appears to require at least two stages: initiation and promotion. Macroscopic neoplastic nodules formed on administration of certain carcinogens appear to be foci for the development of hepatocellular carcinomas. Generally, the administered chemicals are precarcinogens that must be converted in vivo to ultimate carcinogens; all ultimate carcinogens are strong electrophilic reactants. The aromatic amines, amides, and nitro compounds are converted to N-hydroxy derivatives and then to ultimate carcinogens. Unstable monoalkylnitrosamines that decompose to form an alkylating species appear to be the ultimate carcinogenic metabolites of the dialkylnitrosamines and alkylnitrosamides. The conversion of normal cells to tumor cells appears to require at least a quasipermanent alteration in phenotype; DNA-, RNA-, and protein-bound derivatives of hepatic carcinogens have been found in the livers of treated animals. Proposed mechanisms for the induction of hepatic tumors by chemical carcinogens include: direct modification of DNA, RNA, or cellular DNA polymerase; quasipermanent alteration in the expression of cellular information; and stimulation of the preferential growth of quiescent neoplastic or preneoplastic cells. (70 references)

5404 ASPECTS OF COCARCINOGENESIS. (Eng.) Hecker, E. *In: Scientific Foundations of Oncology*. Symington, T.; Carter, R. L., eds. (Chicago: William Heinemann Medical Books, Ltd.): pp. 310-318; 1976.

Carcinogenic factors may be divided into two categories: solitary carcinogens and cocarcinogens. Solitary carcinogens, viewed from the standpoint of environmental hygiene, constitute factors of first-order hazard, and exposure to them carries a high risk of subsequent neoplasia. Exposure of target tissues to cocarcinogens alone will generally not produce neoplasia; however, if exposure to a subthreshold dose of a solitary carcinogen such as an aromatic hydrocarbon is followed by treatment with cocarcinogens, tumors will result. According to the postulated two-stage model of chemical carcinogenesis in mouse skin, the solitary carcinogen is referred to as a tumor initiator and the cocarcinogen as a tumor promoter. Exogenous cocarcinogens of industrial origin include phenols, anthralin, and certain petroleum fractions. The numerous cocarcinogens of plant origin include 12-O-tetradecanoylphorbol-13-acetate (TPA) extracted from the seed oil of the tropical *Euphorbiacea Croton tiglium L.* All twenty-five phorbol 12,13-diesters isolated from hydrophilic and hydrophobic portions of croton oil are active to varying degrees. Two new Euphorbia factors, L_5 and L_6, contain a polyfunctional tetracyclic diterpene called ingenol. Euphorbia factor L_5 is ingenol-3-hexadecanoate, which exhibits lower irritant and cocarcinogenic activity than TPA; Euphorbia factor L_6 is a 3-monoester of ingenol with the polyunsaturated tetradecapenta-2,4,6,8,10-eneoic acid and is highly irritating. The mode of action of endogenous cocarcinogens has been difficult to characterize with any precision. Investigations of cocarcinogenic activity have shown that their mode of action is: (a) essentially reversible; (b) usually protracted; and (c) often accompanied by some manifestation of change. Cocarcinogenesis in other systems involving viruses and physical agents needs to be studied more extensively since most published work relates to synergistically acting chemical agents. (18 references)

5405 ENVIRONMENTAL INFLUENCES ON THE LIVER AND GASTROINTESTINAL TRACT. (Ger.) Schmid, M. (Stadtspital Waid, CH-8037 Zurich, Switzerland). *Schweiz Med Wochenschr* 106(9): 289-295; 1975.

In this review article the following is discussed: the liver as a detoxifying tissue and its adaptation, hepatic enzyme induction by DDT and deviant calcium metabolism, carcinogen immobilization by smooth endoplasmic reticulum, portal hypertension resulting from chronic intoxication, and exogenous challenges to the gastrointestinal tract. Mention is made of the correlation between vinyl chloride and hemangioendothelioma; the same tumor has been observed after arsenic exposure. (32 references)

5406 CARCINOGENESIS OF THE LUNG. GENERAL REVIEW OF EXPERIMENTAL DATA. (Fre.) Chretien, J. (Service des Maladies respiratoires, U.E.R. Paris XII, 40, av. de Verdun, 94000 Creteil, France); Masse, R. *Rev Fr Mal Respir* 4(1): 23-45; 1976.

Basic theories on the initiation and growth of malignant tumors, in general, and bronchopulmonary cancer, in particular, are reviewed. Etiologic factors such as the viral, physicochemical, immunological, and genetic types are considered. Viral particles and antigens have been demonstrated in the human lung cancer of the alveolar cell. The more common human lung cancer is bronchogenic carcinoma, for which the etiologic role of environmental carcinogens is supported by extensive epidemiological data. Animal experimental data on hydrocarbons, nitrosamines, and the effect of ionizing radiation are also cited. Defense mechanisms of the lung are considered, particularly lymphatic drainage, which may play a role in individual susceptibility to carcinogens. Histopathological evidence for the progressive transformation of normal bronchopulmonar tissue to the neoplastic through metaplastic stages is described. Animal and human data show that carcinogens appear to affect specific target cells. The validity of using animal models to study bronchopulmonary cancer is questioned because of the difficulty of approximating human conditions of carcinogen exposure. (138 references)

5407 CUTANEOUS ONCOLOGY 1950-1975. (Eng.) Van Scott, E. J. (Dept. Dermatology, Skin and Cancer Hosp., Temple Univ. Health Sciences Center, 3322 North Broad St., Philadelphia, PA 19140). *J Invest Dermatol* 67(1): 195-198; 1976.

Advances in cutaneous oncology between 1950 and 1975 are discussed in terms of etiology, mechanisms of carcinogenesis, and therapy. The advances includ the discoveries that DNA alteration is requisite fo carcinogenesis and that DNA repair processes are important deterrents in the development of cancer. The single formidable therapeutic weapon against epidermal cancer has been topical chemotherapy with 5-fluorouracil. Clinical experience with this agent indicates that its early and adequate use can resul in the complete eradication of precancerous keratos and superficial epidermal cancers. The therapy, which is self-administered by patients, can be repeated safely as often as necessary to assure that microfoci of early epidermal cancers are obliterate even before clinical detection. The potential of immunotherapy against melanoma has been widely explored in recent years; however, mortality rates have not improved and cure still depends entirely c complete surgical removal of early lesions. Therapeutic treatment of mycosis fungoides has substantially improved within the past 25 yr. Two treatments are responsible for the improved prognosis in patients afflicted with this cutaneous lymphoma: whole-body topical administration of mechlorethamin and whole-body administration of high-energy electrons. (22 references)

5408 LATE SIDE EFFECTS OF TREATMENT: SKELETAL, GENETIC, CENTRAL NERVOUS SYSTEM, AND ONCOGENIC. (Eng.) Jaffe, N. (Outpatient Tumor Therapy Clinics, Sidney Farber Cancer Center, Boston, MA). *Pediatr Clin North Am* 23(1): 233-244; 1976.

Major sequelae attributed to treatment with antica cer agents are outlined. Hepatic toxicity has been ported following treatment with methothrexate and 6-mercaptopurine, pulmonary disease has followed treatment with busulfan, bleomycin, and methotrexa and daunorubicin and adriamycin have caused long- and short-term cardiac changes. Hemorrhagic cystit has been reported as a complication of cyclophosphamide therapy, osteoporosis and fractures have occurred following prolonged methotrexate therapy, azoospermia has been associated with chlorambucil and cyclophosphamide, oligomenorrhea or amenorrhea has been reported in association with chemotherapy or Hodgkin's disease, and irregularity in menstrual unction and amenorrhea have been recognized in ssociation with busulfan, cyclophosphamide, chlorambucil, and vinblastine. Many antineoplastic agents re teratogenic in laboratory animals, although no xcess in inherited defects or complicated pregnanies have been recorded in women treated with folic cid antagonists, alkylating agents, mitomycin C, ctinomycin D, or methotrexate. The carcinogenic otential of alkylating agents and procarbazine has een recognized for several years, as has that of onizing irradiation. Therapeutic irradiation may lso impair the growth and development of bony and oft tissues and organs and may cause secondary bnormalities in growth as a result of its effects n the endocrine glands. Intrathecal methotrexate ay cause neurological complications. Since the asic disease for which treatment is being administered probably represents a far greater immediate hreat than the late complications, alternative pproaches would only be justifiable if efficacy is aintained and adverse effects are more acceptable. 83 references)

409 SOME ILLUSTRATIVE SYSTEMS OF CHEMICAL CARCINOGENESIS: (3) NITROSAMINES. (Eng.) agee, P. N. *In: Scientific Foundations of Oncology.* ymington, T.; Carter, R. L., eds. (London: William einemann Medical Books Ltd.): pp. 292-301; 1976.

he chemical carcinogenesis of nitrosamines is eviewed, along with their acute toxicity and mutaenic and teratogenic action. In animals, the typical cute toxic manifestation of dialkylnitrosamines is zonal centrilobular necrosis in the liver. Since he different nitrosamines appear to be organ-specifc, their carcinogenesis in the liver, kidney, uriary bladder, stomach, nervous system, esophagus, ung, and skin is discussed separately. In general, he compounds exert their action via the intermediary ormation of alkylating agents. Most of the dialkyl nd cyclic nitrosamines investigated since 1956 have aused liver tumors, with or without tumors in other rgans, in a wide range of species, including the onkey. Tumors of the kidney, either epithelial or nterstitial in origin, can be induced in the rat by single dose of several nitrosamines, including the imethyl and diethyl compounds and N-nitrosomorphoine. Early studies of bladder cancer in rats indiated that di-n-butylnitrosamine and butyl(4-hydroxyutyl)nitrosamine induced papillomas and squamous ell carcinomas; later findings recognized the imporance of the 4-hydroxybutyl group for bladder specifcity, possibly because of its conversion into butyl-3-carboxypropyl)nitrosamine by the vesical epithelim. Squamous stomach cancer has been induced in rats nd mice by N-methylnitrosourea or N-methylnitrosorethane given po and glandular stomach cancer, by -methyl-N'-nitro-N-nitrosoguanidine or N-methyl-N'-cetylnitrosourea given po. Nervous system tumors ave been induced by nitrosamides in various strains f rats, rabbits, and dogs, but methylnitrosourea as not found to be carcinogenic in the nervous ystem of Rhesus monkeys, pigs, sheep, or guinea igs. Unlike the nitrosamides, which decompose rapdly after injection into animals, the nitrosamines equire enzyme activity for decomposition and therefore persist in the body as the unchanged molecule for longer periods. Most experiments have been carried out with the methyl and ethyl derivatives, and the long chain dialkyl and cyclic nitrosamines have been studied only recently. (53 references)

5410 INVOLVEMENT OF RADICALS IN CHEMICAL CARCINOGENESIS. (Eng.) Ts'o, P. O. P.; Barrett, J. C.; Caspary, W. J.; Lesko, S. A.; Lorentzen, R. J.; Schechtman, L. M. *In: Aging, Carcinogenesis, and Radiation Biology. The Role of Nucleic Acid Addition Reactions.* Smith, K. C., ed. (New York: Plenum Press): pp. 373-398; 1976.

The conversion of a number of chemical carcinogens to free radicals that react with DNA either directly, to yield adducts, or indirectly, to cause polynucleotide chain scission, is discussed. The only adduct formed between such radicals and DNA the nature of which is known is N-deoxyguanosin-8-yl-acetylaminofluorine, which is formed in the reaction of DNA with N-hydroxy-N-2-acetylaminofluorene. Autoxidation, particularly of certain phenolic compounds (such as 6-hydroxybenzo(a)pyrene), is capable of producing all the reactive species derived from the reduction of molecular oxygen. There is evidence for the involvement of radicals in neoplastic transformation. The radical scavenger cysteamine HCl has reduced the number of transformed foci in mouse fibroblasts in vitro in the presence of 7,12-dimethylbenz(a)anthracene (DMBA) and has reduced the number of mammary tumors induced by DMBA. Antioxidants have been used to reduce the number of chromosomal breaks and to decrease the incidence of neoplasia. The nature of the critical cellular target involved in the interaction with chemical carcinogens is still undefined. Since most chemical carcinogens are also mutagenic, many think that DNA alteration is required for oncogenic activity. Greater attempts should be made to isolate and identify metabolites that will covalently link with DNA and produce adducts that are identical to those formed when the parent compound is administered in vivo or added to transformable cells. (54 references)

5411 INTERACTION WITH NUCLEIC ACIDS OF CARCINOGENIC AND MUTAGENIC N-NITROSO COMPOUNDS. (Eng.) Lijinsky, W. (Oak Ridge Natl. Lab., Oak Ridge, TN). *Prog Nucleic Acid Res Mol Biol* 17: 247-269; 1976.

The relationship between the interaction of nucleic acids with nitroso compounds and carcinogenesis and mutagenesis is reviewed. The biological activity of the nitroso compounds is discussed in terms of two classes of compounds--those that act directly and those that require activation to be effective. The former are the nitrosamides, derivatives of N-nitroso-N-alkylcarbamic acids, and the latter are the nitrosamines. Over 100 nitrosamines have been tested for carcinogenic activity, mostly in the rat, which appears to be the most sensitive species. There is no essential difference between open-chain and cyclic nitrosamines, either in terms of affected organs or in terms of dose required for carcinogenesis, but the presence of substituents in either aliphatic or cyclic nitrosamines has profound effects on carcinogenicity. Alkylation has been studied mostly in bacteria, viruses, and chemical systems, while relatively few studies have been done in tissue or organ culture. In vivo animal studies have been concerned with validating the concept that chemical or enzymatic conversion of nitroso compounds into moieties capable of alkylating nucleic acids, particularly DNA, at specific sites results in faulty replication, leading to faulty transcription and the creation of neoplastic cells. Although there is evidence that mutagenesis in microorganisms is related to interaction of the mutagen or its metabolite with DNA, this relationship in carcinogenesis is far from proved. Nor is there any certainty that mutagenesis and carcinogenesis are related. Earlier correlations of N-7 alkylation of guanosine by nitroso compounds with carcinogenic activity have not been validated. Recent studies of DNA repair following treatment of animals with nitroso compounds suggest that slow or deficient repair might be a factor in liver carcinogenesis. DNA breaks induced by hepatocarcinogens were repaired at much slower rates than those induced by compounds (e.g., methylnitrosurea) that do not cause liver tumors. (82 references)

5412 AFLATOXIN MUTAGENESIS. (Eng.) Ong, T.-M. (Natl. Inst. Environmental Health Sciences, P. O. Box 12233, Research Triangle Park, NC 27709). *Mutat Res* 32(1975): 35-53; 1975.

Studies on the mutagenic and other genetically related activities of aflatoxin are reviewed. The subjects discussed include the induction of chromosome aberrations and of gene mutations, the conversion of aflatoxins to toxic and/or mutagenic metabolites by mammalian liver microsomes, the ability of aflatoxins to inhibit mitosis, and the mutagenic hazard to man. In addition, the chemistry, toxicity, carcinogenicity, and teratogenicity of aflatoxins are described briefly. (108 references)

5413 CERTAIN GENERAL ASPECTS OF THE PROBLEM OF AFLATOXINS. (Fre.) Ferrando, R. (Service de Nutrition et d'Alimentation, Ecole Nationale Veterinaire, 94701 Alfort, France). *Med Chir Dig (Suppl 2)* 59-60; 1975.

In studying the toxicity of aflatoxins, basic research is required in human and animal pathology, as well as in the evolution and prevention of mycotoxicosis. Aflatoxins cause a rapid depletion of the hepatic reserve of vitamin A (retinol). The decrease of retinol in the liver is accompanied by a significant reduction of the zinc supply. In the absence of zinc, the action of vitamin A is impaired. A deficiency in vitamin D_3 in the presence of aflatoxin retarded the growth of ducklings. There was a weight gain of 174 g in 22 days in the group receiving aflatoxin against a corresponding increase of 415 g in the control group. When a dose of 750 IU vitamin D_3/kg of feed was administered, the weight gains were 301 and 529 g, respectively. Ossification troubles also appeared to be increased among the vitamin D_3-deficient subjects receiving aflatoxins. The link between nutritional deficiencies and aflatoxin toxicity is therefore stressed. (4 references)

5414 RESERPINE. (Eng.) IARC Working Group. *In: IARC Monographs on the Evaluation of the Carcinogenic Risk of Chemicals to Man: Some Natural Occurring Substances. Meeting Held in Lyon, 7-13 Oc ober 1975.* International Agency for Research on Cancer. (Lyon, France): vol. 10, pp. 217-229; 1976.

The alkaloid reserpine, produced by some species of *Rauwolfia*, an Asian shrub, is used as a tranquilize and as a sedative. Four studies of exposed human groups have indicated that the therapeutic use of *Rauwolfia* derivatives may increase the risk of brea cancer: calculated risk ratios among drug users wer 3.5, 2.0, 2.0, and 1.2. A significantly increased risk was not established in two other studies. Following a daily intake of 0.24 μg of reserpine in th diet, mammary tumor incidence in C3H mice was sligh increased from 12/22 in control mice to 15/24, and the tumor latent period decreased from earliest appearance at 320 days to 216 days. Of 135 Wistar rats of both sexes receiving 0.1 ppm reserpine in a semiliquid diet, 16% developed tumors (lymphosarcomas and hepatomas); no control animals developed tumors. The data from animal studies and epidemiolo ical studies are considered inadequate for evaluation of the risk to humans from exposure to *Rauwolfia* derivatives. (39 references)

5415 STILBESTROL ADENOSIS-CARCINOMA SYNDROME. REVIEW. (Ger.) Ulfelder, H. (Harvard Medical Sch., Massachusetts General Hosp., Boston, MA *Geburtshilfe Frauenheilkd* 35(5): 329-333; 1975.

A historical review of the original seven cases of vaginal clear-cell adenocarcinoma in offspring following maternal diethylstilbestrol (DES) use durin pregnancy is combined with an analysis of availabl epidemiological data. The latter is a registry of 170 cases of vaginal or cervical clear-cell adenocarcinoma in females under 30 yr of age. The follo ing have been established: (a) the onset of cervic clear-cell adenocarcinoma was always within the sa age range; (b) the vaginal: cervical ratio was 100 70; (c) DES or other stilbene management of pregna was reported by 65% of the mothers; (d) the dose schedule was between 1.5 and 225 mg daily over per ods ranging from 1 wk to 9 mo and was always begun before the 18th week; (e) an adenosis coexisted wi 97% of the vaginal and 50% of the cervical adenoca cinomas; (f) pelvic node metastases were found in majority of stage III and stage IV cases and in ov 50% of stage II cases. In the latest cancer regist there were 16 clear-cell types with no history of maternal stilbenes, more than the total reported i the world literature prior to stilbestrol synthesi The tumor localization was reversed in 15 of these cases to 10 cervical and 5 vaginal, reflecting the long-recognized occurrence of spontaneous cervical adenocarcinoma. Since spontaneous vaginal adenocar cinomas are unknown, their etiology must be DES-associated. Adenosis is not the only accessory sym in clear-cell malignancy--there were extensive gly gen-free epithelial plica or partial septa in

 vagina and cervical ectropion. The probability
 carcinoma formation from these benign changes is
,000. Intermediate states have not been confirmed;
ere are also data that about 5% of all women
esent with vaginal anomalies, including adenoses,
 extent of which is independent of the endocer-
al mucosal limits. (11 references)

16 HYDROXYSENKIRKINE. (Eng.) IARC Working Group.
In: IARC Monographs on the Evaluation of the
rcinogenic Risk of Chemicals to Man: Some Naturally
curring Substances. Meeting Held in Lyon, 7-13 Oct-
er 1975. International Agency for Research on Cancer.
yon, France): vol. 10, pp. 265-268; 1976.

e chemical and physical data and biological data
 its carcinogenicity to man have been listed for
 pyrrolizidine alkaloid hydroxysenkirkine, which
 been isolated from the plant *Crotalaria labur-*
folia L. *eldonae* (used as a medicinal herb in
nzania). No data are available regarding its car-
nogenicity to man, and it has only been tested in
ve male rats. When these weanling Wistar-Porton
ts were given single ip injections of 100-300
/kg hydroxysenkirkine, one given 300 mg/kg and
lled after 14.5 mo showed three apparently separate
mors of the cerebrum, all astrocytic. Tumors of
 CNS were reported to be rare in rats of the
lony used. The available information is considered
sufficient for evaluation of the carcinogenicity
 this substance. (4 references)

17 THE PILL AND THE BREAST. (Eng.) Leis, H.
P. (New York Medical Coll., New York, NY
029); Black, M. M.; Sall, S. *J Reprod Med* 16(1):
9; 1976.

 influence of oral contraceptives, which contain
nthetic estrogens and progesterones, in breast
ssue was reviewed. Women taking these drugs may
ve functional breast symptoms that mimic those of
rly pregnancy, and galactorrhea is sometimes seen.
east cancers with specific estrogen receptors
bout half of all cases) frequently respond to
rmonal manipulation. There is no evidence that
trogen increases the incidence of breast cancer,
t it does increase its growth rate. The protective
fluence of early parity seems due to the estriol
ncentration during pregnancy; this noncarcinogenic
trogen competes with the more carcinogenic forms.
emenopausal breast cancer (peak age group 45-49)
y be related to estradiol levels. Postmenopausal
east cancer (peak age 65) may be due to the exces-
ve production of estrone by the adrenal elabora-
on of androstenedione. The use of estrogen prepa-
tions is contradicted in women with any adverse
east symptoms or in high-risk women. Major risk
ctors are sex, age, family history, parity, pre-
ous cancer, and precancerous masteopathy. Promi-
nt risk factors include prolonged menstrual
tivity, other organ cancers, wet-type ear wax,
gh dietary fat intake, the triad of obesity/
abetes/hypertension, hypothyroidism, and chronic
ntal stress. Possible risk factors include heavy
diation exposure, immunodeficiency, viruses,
verse hormonal levels, exogenous estrogen intake
by late or nulliparous women, trauma, and certain chemicals and drugs (notably reserpine). The use of estriol (for its anticarcinogenic capacity) and progesterone (for its estrogen-antagonistic effects) in all estrogen preparations was suggested. (35 references)

5418 RIDDELLIINE. (Eng.) IARC Working Group. *In: IARC Monographs on the Evaluation of the Carcinogenic Risk of Chemicals to Man: Some Naturally Occurring Substances. Meeting Held in Lyon, 7-13 October 1975.* International Agency for Research on Cancer. (Lyon, France): vol. 10, pp. 313-317; 1976.

Some chemical and physical properties and some biological data relevant to the possibility of carcinogenic hazard to man have been listed for the pyrrolizidine alkaloid riddelliine, which has been isolated from the plant *Crotalaria juncea* and from several *Senecio* species. *C. juncea* has been used as a remedy for hemoptysis in Africa, and for impetigo and psoriasis in India; the leaves and seeds have also been used as food in Africa. The available information is insufficient for evaluation of its carcinogenicity in man or animals. However, the development of chronic liver lesions in rats given single doses of riddelliine is essentially the same as with lasiocarpine, retrorsine, or seneciphylline: the characteristic feature is megalocytosis, with nodular hyperplasia, fibrosis, and bile duct proliferation. The iv LD_{50} in mice is 105 mg/kg. (8 references)

5419 OESTROGENS AS A CAUSE OF ENDOMETRIAL CARCINOMA (Letter to Editor). (Eng.) Corcoran, R. (St. Catherine's Hosp., Birkenhead, Merseyside); Howard, R. *Br Med J* 1(6020): 1276-1277; 1976.

A moderate rather than conservative approach toward estrogen replacement therapy in patients with climacteric and postmenopausal disturbances is discussed. It is suggested that the benefits of administering progestational compounds with estrogens overshadow the disadvantages. Progestogens have been shown to be effective in causing regression of endometrial hyperplasias. However, there is a need for continued study of this replacement therapy since there are a few cases of endometrial carcinoma in patients taking oral contraceptives of both the sequential and combined forms. Such patients are thought to have localized islands of endometrium refractory to the progestogen component. These loci subsequently develop the carcinoma. (9 references)

5420 THE MUTAGENICITY OF CAPTAN AND RELATED COMPOUNDS. (Eng.) Bridges, B. A. (M. R. C. Mutation Unit, Univ. Sussex, Falmer, Brighton BN19QG England). *Mutat Res* 32(1975): 3-34; 1975.

Experiments to determine the mutagenicity of captan (N-trichloromethylthio-4-cyclohexene 1,2-dicarboximide) and of related compounds are reviewed. The results show that captan is a potent mutagen in both prokaryotes and eukaryotes, producing excisable DNA damage that results in the production of point mutations. The compound has no apparent mutagenic effect on Drosophila or maize, but it induces dominant lethal mutations in rats and mice and transmissible second-generation effects in mice. At high doses, captan mutates bacteria in host-mediated assay systems; it is teratogenic in several systems and produces chromosome aberrations in cultured mammalian cells. Tests of folpet and difolatan yielded comparable results to captan. There is no proof that captan is carcinogenic, but the genetic hazard to man might be appreciable. Pending more conclusive studies on the risks of captan, its present uses should be reevaluated on the basis of current knowledge. In addition, the current permissible levels in foodstuffs should be reassessed. (70 references)

5421 MUTAGENICITY AND METABOLISM OF VINYL CHLORIDE. (Eng.) Montesano, R. (Unit Chemical Carcinogenesis, International Agency Res. Cancer, Lyon, France); Bartsch, H. *Adv Tumour Prev Detect Charact* 3: 242-245; 1976.

Studies on the mutagenicity and metabolism of vinyl chloride are reviewed. The mutagenic and/or carcinogenic effect of vinyl chloride appears to be mediated through the formation of electrophilic metabolites by microsomal mixed-function oxidase. The pretreatment of rats with drugs that modify the activity of the enzyme results in changes in the in vitro mutagenicity of vinyl chloride. This supports the hypothesis that the carcinogen has to be converted into electrophilic and mutagenic metabolites. Pretreatment of rats with phenobarbitone increases the mutagenic response, whereas the administration of pregnenolone-16α-carbonitrile and aminoacetonitrile reduces the liver-mediated mutagenicity of vinyl chloride. Experiments involving the trapping of chloroethylene oxide in vitro by 4-nitrobenzylpyridine, following activation of vinyl chloride in the presence of mouse liver microsomal enzymes, an NADPH generating system, and oxygen, support the hypothesis that monochloroethylene oxide is a primary reactive and mutagenic metabolite of vinyl chloride. (29 references)

5422 PENICILLIC ACID. (Eng.) IARC Working Group. *In: IARC Monographs on the Evaluation of the Carcinogenic Risk of Chemicals to Man: Some Naturally Occurring Substances. Meeting Held in Lyon, 7-13 October 1975.* International Agency for Research on Cancer. (Lyon, France): vol. 10, pp. 211-216; 1976.

Some chemical and physical data and biological data on its carcinogenicity to man have been listed for the mycotoxin penicillic acid, which is produced by certain species of *Penicillium* and *Aspergillus* and is sometimes found as a contaminant in moldy corn and poultry feed. No data from human case reports or epidemiological studies are available regarding carcinogenicity, but sc inoculation of mice and rats resulted in the production of local sarcomas. Local tumors developed in 6/19 Tuck No. 1 strain mice treated twice weekly with 0.2 mg in arachis oil for up to 65 wk. Local sarcomas and fibrosarcomas developed in between 48-67 wk in 4/4 rats given 1 mg of the substance in 0.5 ml of arachis oil. The LD_{50}' of penicillic acid in mice were 250 mg/kg iv and 600 mg/kg po. The compound is known to induce single- and double-strand breaks in the DNA of HeLa cells. (19 references)

5423 CONTRACEPTION POSTABORTION AND POSTPARTUM. ADVANTAGES AND DISADVANTAGES OF HORMONAL CONTRACEPTIVES WITH PARTICULAR REFERENCE TO THE RELATIONSHIP BETWEEN FEMALE SEX HORMONES AND THROMBO EMBOLISM AND CARCINOMA OF THE BREAST AND GENITALS. (Ger.) Vorherr, H. (Dept. Obstetrics-Gynecology and Pharmacology, Univ. New Mexico, Sch. Medicine, Albuquerque, NM 87131). *Gynaekol Rundsch* 15(1): 48-73; 1975.

Specific data conclusively linking oral contraceptives with mammary or abdominal cancer are lacking. Estrone and estradiol are the only estrogens associated with carcinogenicity or cocarcinogenicity, and progesterone can promote estrogenic activity. Nulliparas under long-term estrogen management have twice the incidence of breast cancer as controls. A two or three times higher breast cancer frequency also occurs in women with a family history of the disease; the risk is 15%-50% in relatives of an affected female, compared with an average 5%-6% in the general population. Although there is no premen pausal relationship between breast carcinoma and endometrial carcinoma, 30%-50% of all patients with postmenopausal endometrial carcinomas also develop breast cancer, implicating estrogenic deficit. That the majority of malignancies in hormone-dependent tissues occur during menopause or postmenopausal periods, when estrone is the dominant estrogen with facile access to nuclear receptors, suggests increased stimulus of messenger RNA and eventual increased cell proliferation. The probability is high that oral contraception does not elevate the risk of breast cancer. Similarly, the low estrogen content of oral contraceptives makes it unlikely that the pill favors genital carcinoma. (No references)

5424 REPAIR OF DNA ADDUCTS PRODUCED BY ALKYLATION. (Eng.) Strauss, B. S. *In: Aging, Carcinogenesis and Radiation Biology. The Role of Nucleic Acid Addition Reactions.* Edited by K. C. Smith. (New York: Plenum Press): pp. 287-314; 1976.

The production of various adducts to DNA, the repair mechanisms that affect their stability, and th relevance of the findings to mutagenesis and carcin genesis are discussed. The important biological problem is identification of the lesions responsibl for inactivation, mutation, and carcinogenesis. A variety of DNA adducts have been isolated from animals fed alkylating agents or nitrosamines. The simplest test of the relevance of a lesion or a compound to carcinogenesis is the induction or inhi tion of excision type repair, and only those lesion subject to large patch excision repair are likely t be carcinogenic. Different alkylating agents produc different patterns of repair, and excision of certain adducts may occur preferentially in certain

ts of the genome, such as the DNA growing point.
increased repair seen at the growing point may
due to either the concentration of repair enzymes
this region or to its special reactivity, so that
e particular adduct that is excised in large
ches tends to be formed at growing points. A
hanism for postreplication repair in mammalian
ls is proposed that uses the known biochemical
ctions of strand displacement and branch migra-
n to account for the synthesis of a complement of
damaged region by a copy choice mechanism. The
el leads to two predictions: (a) there is a small
ion in which both strands are newly synthesized;
(b) four-pronged forks occur that consist of
ee normal double-stranded molecules and one prong
which both strands are newly synthesized, one of
ch contains a copy of the damaged region. Although
ision repair in human cells may be useful to
ermine potential hazard, the hazard itself is the
lication process that occurs while the lesion is
ll in the DNA. Damage in the DNA is fixed by
sage of the replication complex past the point of
lesion, and the molecular nature of the events
t occur during this passage are probably critical
both carcinogenesis and mutagenesis. (58 refer-
es)

5 DNA FRAGMENTATION AND DNA REPAIR AS AN IN
VITRO AND IN VIVO ASSAY FOR CHEMICAL PRO-
CINOGENS, CARCINOGENS AND CARCINOGENIC NITROSA-
N PRODUCTS. (Eng.) Stich, H. F.; San, R. H. C.;
, P. P. S.; Koropatnick, D. J.; Lo, L. W.; Laishes,
A. *In: Screening Tests in Chemical Carcinogenesis.*
ting Held in Brussels, 9-12 June 1975. Interna-
nal Agency for Research on Cancer. (Brussels,
gium): no. 12, pp. 617-638; 1976.

applicability of various biological criteria
oplastic transformation, clone-forming capacity,
omosomal aberrations, sister chromatid exchanges,
ations, amd host cell reactivation of impaired
al genomes) are discussed as suitable indicators
the carcinogenic potential of chemicals. Partic-
r emphasis is given to the ability of carcinogens
elicit DNA repair synthesis in cultured cells
vitro and to fragment the DNA of the rodent
estive tract and liver cells in vivo. The car-
ogenic potential of a compound and its ability
trigger DNA repair synthesis were correlated
an experiment in which human and Syrian hamster
roblasts were treated with 31 direct-acting car-
ogens, 38 procarcinogens, 24 noncarcinogens and
mutagens. Procarcinogens were activated either
the 9,000-g supernatant, the 105,000-g pellet,
the 105,000-g supernatant fractions of the
ver or other organs of mammals, birds, or
sh. The DNA of the rapidly proliferating cells of
e digestive tract or partially hepatectomized
vers of rodents can be labeled readily with ^{3}H-
ymidine, and the effect of in vivo carcinogen
eatment on DNA fragmentation within these tissues
n be measured by shifts in sedimentation profiles
the DNA in alkaline sucrose centrifugal gradients.
mparisons of the fragmentation capacity of the
rcinogen 4-nitroquinoline 1-oxide with the noncar-
nogen 6-nitroquinoline 1-oxide and of the direct-
ting carcinogenic nitrosation products of methylguanidine with the procarcinogenic form itself have been made by these assays of DNA fragmentation in the epithelial cells of the cardiac stomach of Swiss mice. (65 references)

5426 CHEMICALLY-INDUCED DNA-PROTEIN CROSS-LINKS. (Eng.) Thomas, J. O. *In: Aging, Carcinogenesis, and Radiation Biology. The Role of Nucleic Acid Addition Reactions.* Edited by K. C. Smith. (New York: Plenum Press): pp. 193-205; 1976.

Studies on chemically induced DNA-protein cross-links via an activated intermediate and by cytotoxic chemicals are reviewed. Evidence is presented that demonstrates that DNA-protein cross-links may be induced by the following compounds: formaldehyde, glutaraldehyde, carbodiimide, nitrous acid, hydroxylamine, O-methylhydroxylamine, bisulfite, nitrogen mustard, chlorambucil, β-propiolactone, and benz(a)-pyrene. Many studies were conducted using animal cells, and clear-cut results were not obtained due to the complexity of the system. Bacteriophage provide a much simpler system for investigating the chemistry of DNA-protein cross-links and provide a greater sensitivity with which they can be detected. The importance of these chemically induced cross-links to carcinogenesis and aging can only be assessed after a larger number of chemicals have been studied. Of particular interest in this respect are free radicals, malonaldehyde, the nitrosamines, and polycyclic hydrocarbons. (58 references)

5427 RADIATION-INDUCED CROSS-LINKING OF DNA AND PROTEIN IN BACTERIA. (Eng.) Smith, K. C. *In: Aging, Carcinogenesis, and Radiation Biology. The Role of Nucleic Acid Addition Reactions.* Smith, K. C., ed. (New York: Plenum Press): pp. 67-81; 1976.

With increasing fluences of UV radiation, decreasing amounts of DNA free of protein are extracted from irradiated cells, and the unextractable DNA is found in the insoluble protein fraction. Cross-linking of DNA and protein plays a significant role in the killing of UV-irradiated cells. *Escherichia coli* cells grown in the absence of thymidine become progressively more sensitive to killing by UV during the first 40 min of starvation and then become progressively more resistant. The amount of DNA cross-linked with protein changes with time in the same manner. The temperature at which frozen *E. coli* cells are irradiated determines the rate of killing, and the photochemical event that correlates with loss of viability under these conditions is the cross-linking of DNA with protein. Replacement of DNA thymine with 5-bromouracil enhances the production of DNA-protein cross-links, which is correlated with increased sensitivity to killing by UV radiation. The portion of the DNA that was most recently replicated is the portion most sensitive to cross-linking with protein. Pretreatment of bacterial cells with either acridine orange or methylene blue followed by exposure to intense visible light results in rapid killing and cross-linking of DNA with protein. A number of amino acids photochemically add to thymine and to uracil. The DNA-protein cross-links can be at least partially repaired by the repair systems controlled by the *rec* and *uvr* genes. (35 references)

5428 UV-INDUCED DNA TO PROTEIN CROSS-LINKING IN CELLS. (Eng.) Todd, P.; Han, A. *In: Aging, Carcinogenesis, and Radiation Biology. The Role of Nucleic Acid Addition Reactions.* Edited by K. C. Smith. (New York: Plenum Press): pp. 83-104; 1976.

Studies indicating that DNA protein cross-links are induced in mammalian cells by UV light are summarized and experimental studies that attempt to correlate cross-link induction and biological damage are reviewed. Cross-linking was demonstrated in two ways: the detection of unextractable DNA in irradiated cells, and the isolation and identification of specific photoproducts from irradiated cells. The involvement of protein in UV-induced lethality was correlated utilizing action and absorption spectra; the investigation of biological damage not attributable to pyrimidine dimers; correlations of cross-link induction with biological effect under various experimental conditions; and a search for repair processes associated with DNA protein cross-linking. There is sufficient evidence that proteins are involved in the UV response of mammalian cells. Studies with Chinese hamster cells and with L cells showed that exposures required to reduce survival to a given level are a function of wavelength, and the general patterns of the two action spectra are the same, both having a broad peak in the region of 270 nm, suggesting that DNA and protein are involved. The incorporation of 5-bromo-2'-deoxyuridine in the DNA of mammalian cells significantly enhances the amount of DNA cross-linked to proteins. The cell cycle-dependent fluctuations in the yield of DNA cross-linked to proteins are almost identical to the changes in cell survival throughout the cycle. The formation of cross-links between DNA and enzymes or other proteins (histones) in its vicinity could prevent normal DNA repair processes. Consequently, damage would become irreparable and result in cell death. (59 references)

5429 TRENDS AND NEW FINDINGS IN THE ASSESSMENT OF THE SOMATIC RADIATION RISK. (Ger.) Jacobi, W. (Gesellschaft fuer Strahlen- und Umweltforschung mbH, Institut fuer Strahlenschutz, 8000 Munchen-Neuherberg, West Germany). *Fortschr Rontgenstrahl* 124(5): 489-492; 1976.

New perspectives on somatic radiation risk are presented. Based on data from atom bomb survivors and patients with Marie-Struempell disease that were exposed to radiotherapy, the cancer risk in the intestines, lung, and female mammary glands after whole body irradiation is five times higher than the leukemia risk. It follows that the highest permissible whole body exposures in the future should be one-fifth of the highest permissible partial dose for hemopoietic tissue. The dose-injury risk curve, based on the linear onset of leukemia after neutron exposure, should be changed to a nonlinear curve, with a plateaulike increase under 100 rads exposure (characteristic of x-, γ-, β-, and electron radiation). These lower doses applied to cell cultures and experimental animals show that radiation repair occurs during the first phase of carcinogenesis. At the same exposure the cancer risk at doses below about 0.1 rad/min is one-fifth to one-third smaller than that for short-term radiation at higher doses. At very low doses a latency time longer than the customary life span is possible. (5 references)

5430 RADIOBIOLOGY OF ENDOCRINE ORGANS. (Eng.) Key, M. *In: Hormones and Cancer.* Charyulu K. K. N.; Sudarsanam, A., eds. (Miami: Symposia Specialists): pp. 21-33; 1976.

The radiobiology of the endocrine organs is discussed in terms of the direct effect of ionizing radiation on the individual glands. Indirect effect are also considered and the evidence for radiation-induced endocrine tumors is examined. Most of the endocrine glands are radiation resistant. These include the pituitary, thyroid, adrenals, and the exocrine and endocrine parts of the pancreas. The gonads are considered the most sensitive because of the sensitivity of germ cells; however, the gon cells involved in hormonogenesis are more resistant The thymus is also very sensitive. Irradiation caus systemic effects such as changes in blood pressure, water excretion, gastrointestinal mobility, and permeability. These effects are often elicited in tissues at a distance from the actual irradiation site; they appear to be modified by hormones and biogenic amines. Animal experiments indicate that endocrine imbalance is a major factor in radiation-induced endocrine tumors. Evidence for radiation-induced tumors in humans is sparse. Thyroid cancer incidence was shown to be approximately linear wit radiation dose in persons given x-ray therapy to t upper chest in infancy or early childhood. Twice t normal mortality due to pancreatic and ovarian tum was seen in patients who had been irradiated for ankylosing spondylitis. It is concluded that altho endocrine organs are radioresistant for their horm al function, they are relatively sensitive to radi tion carcinogenesis. (41 references)

5431 RADIOLOGY NOW. MALIGNANCIES FOLLOWING LO RADIATION EXPOSURES IN MAN. (Eng.) Pochi E. E. (Natl. Radiological Protection Board, Harwel Didcot, Oxfordshire OX 11 0RQ, England). *Br J Radi* 49(583): 577-579; 1976.

Three lines of evidence indicating that malignancies in humans can be induced by absorbed radiatio doses of less than 10 rads are presented. Death rates from leukemia after atomic bomb exposures in Hiroshima and Nagasaki exceeded the expected rates from October 1950 to December 1972. In Hiroshima, 29,934 persons received an estimated dose of less than 1 rad and 13,787 received an estimated mean dose of 2.9 rads (gamma) plus 0.8 rad (neutron). I Nagasaki, 4,699 persons were exposed to less than rad, while 6,705 persons received an estimated mea dose of 4.0 rads (gamma). An increase in thyroid cancer following scalp irradiation in childhood ha also been observed. Twelve thyroid tumors diagnose as malignant occurred within 12-24 yr after the irradiation of 10,902 children; two such tumors we

corded in the same number of nonirradiated sub-
cts matched for age, sex, country of origin, and
te of immigration. Radiation to the scalp for
nea capitis had been performed on separate days by
ve fields at an air dose of 350-400 R. The estimat-
total average absorbed dose to the thyroid was
2-7.4 rads. Malignancies following fetal irradia-
on have also been reported. Mothers of children
th leukemia were found to have been exposed more
equently to x-ray examination of the pelvis during
egnancy than mothers of normal children. Malignan-
es in the first 10 yr of life increased by an
timated 40% in children exposed to diagnostic
rays in utero. Fetal absorbed doses were estimated
vary from 0.2-20 rads, with a mean of less than 2
ds. (13 references)

32 DO VIRUSES CAUSE HUMAN CANCER? (Eng.)

McKhann, C. F.; Kasperson, E. H. *In: Ad-*
nces in Cancer Surgery. Najarian, J. S.; Delaney,
P., eds. (New York: Stratton Intercontinental
edical Book Corp.): pp. 53-61; 1976.

e two major families of viruses associated with
man tumors are RNA viruses (leukovirus types B and
and DNA viruses (Epstein-Barr virus, Herpes virus
pe 2, papovaviruses, pox virus). The mode of inter-
tion between these viruses and cells in vivo is
iscussed. The steps taken in the investigation of
mor viruses are epidemiology; direct identifica-
ion of viruses by electron microscopy; serology;
solation of viral products such as reverse transcrip-
ase; and isolation of the virus with characteriza-
ion of its transformation potential, origin, and
bility to induce tumors. The prototype for the
udy of human tumors is the Burkitt lymphoma, which
s closely linked with Epstein-Barr virus. The re-
ponse of this tumor to chemotherapy is strongly
orrelated with the level of immune response in the
atient. Carcinoma of the cervix is potentially
aused by herpes type 2 virus, although the prospec-
ive relationship of the virus infection to the
evelopment of carcinoma is not yet known. Carcinoma
f the breast is also a candidate for a human virus-
nduced tumor. Virus is directly implicated in murine
ammary tumors, there is a strong familial incidence
f breast cancer in humans, and virus particles have
een identified by electron microscopy in the milk
nd cancer tissue of many patients with breast can-
er and individuals with family histories of breast
ancer. Virus has also been identified in patients
ith fibroadenoma. Although the evidence is still
ndirect, it appears that viruses do cause human
ancer. (No references)

433 VIRUSES AND HUMAN NEOPLASIA. (Eng.) De

The, G.; Geser, A.; Munoz, N. *In: Scien-*
ific Foundations of Oncology. Symington, T.; Carter,
. L., eds. (Chicago: William Heinemann Medical
ooks, Ltd.): pp. 414-425; 1976.

any human neoplasms, such as leukemias, sarcomas,
ymphomas, and breast carcinomas, may be associated
ith human RNA tumor viruses (oncornaviruses), but
orphological identification of these particles has
ot yet been achieved. A general approach to human
viral oncogenesis can be formulated as follows: (a) establish a tentative association between a virus and a specific tumor by demonstrating the presence of antiviral host reactions, virus-associated antigens, and the viral genome; (b) examine risk populations seroepidemiologically to formulate an etiological hypothesis; and (c) test the hypothesis. The role of Epstein-Barr herpesvirus (EBV) in Burkitt's childhood lymphoma (in East and Central Africa) and nasopharyngeal carcinoma (NPC) is discussed. The discrepancy between the almost universal distribution of EBV and the postulated rarity of EBV neoplasms indicates that EBV must interact with various genetic and/or environmental cofactors to induce a tumor. Both NPC and Burkitt's lymphoma patients have high antibody levels against viral capsid antigens (VCA), early antigens (EA), membrane antigens (MA), and immunoprecipitating antigens (IP). Most evidence implicating a virus in the etiology of squamous carcinoma of the cervix relates to herpes simplex virus type 2 (HSV-2). If a causal association between cervical cancer and HSV, cytomegalovirus (CMV) or papilloma virus is found, cofactors such as hormonal imbalance, immune response alteration, genetic susceptibility, and helper virus intervention must be investigated to explain the relative rarity of cancer in relation to the ubiquity of these viruses. EBV is definitely the etiological agent in infectious mononucleosis (IM), a disease that is wholly benign, self-limiting, and characterized by intense lymphoproliferative changes. Evidence seems to support the idea that IM cell lines are potentially malignant de novo, but are controlled by the host when certain immune responses are evoked by the infected cells. (93 references)

5434 VIRUSES AS CARCINOGENIC FACTORS. MECHANISMS AND THEORY OF TUMORIGENESIS FROM A VIROLOGICAL VIEWPOINT. (Ger.)

Klietmann, W. (Friedrich-Miescher-Laboratorium, Max-Planck-Gesellschaft, 7400 Tuebingen, Spemannstr. 37-39, West Germany). *Dtsch Med Wochenschr* 101(4): 117-123; 1976.

A review of oncogenic viruses in cell culture, malignant transformation by SV40 viruses and virus rescue in cell culture, RNA tumor viruses, the central dogma of molecular biology, and the oncogene and protovirus theories of cancer is presented. Viral aspects of human malignancy are included. (36 references)

5435 STRUCTURAL INTERACTIONS BETWEEN VIRUSES AS A CONSEQUENCE OF MIXED INFECTIONS. (Eng.)

Dodds, J. A.; Hamilton, R. I. *In: Advances in Virus Research.* Laufer, M. A.; Bang, F. B.; Maramorosch, K.; Smith, K. M., eds. (New York: Academic Press): vol. 20, pp. 33-85; 1976.

In vivo structural interactions between viruses during mixed infections are described. The following subjects are discussed: homologous reassembly; heterologous assembly in the absence or presence of homologous components; interactions between pairs of structurally similar and dissimilar viruses; conditions that favor the interactions; virus behavior as determined by phenotype; survival mechanisms for defective viruses and the detection of latent viruses; and virus classification. Experimental approaches to structural interactions in vivo are reviewed with emphasis on the propagation and separation of interacting viruses and confirmation of the interactions. That structural interactions can occur seems particularly true between both similar and dissimilar enveloped viruses. Phenotypic mixing between structurally similar simple viruses results, if cells are doubly infected and replication cycles overlap. If interactions cannot be detected, this may imply that the two viruses have sharply delineated and separate sites of assembly within the cell. Genomic masking is the only outcome between structurally dissimilar simple viruses. (139 references)

5436 VIRAL AND HORMONAL INDUCTION. MOLECULAR BIOLOGICAL PROBLEMS IN GYNECOLOGY. (Ger.)

Caffier, H. (Universitaets-Frauenklinik, Josef-Schneider-Strasse 4, D-8700 Wuerzburg, West Germany). *Med Klin* 71(21): 881-887; 1976.

This review touches on the genetic code and relevant regulatory mechanisms, the viral and hormonal theories of carcinogenesis, the molecular and endometrial effects of estrogens, and the relation between adenocarcinoma and diethylstilbestrol (DES). With one exception, herpes simplex virus (HSV-2) has not been identified in carcinomatous tissue of the cervix; nor has HSV-2 DNA, except for some fragments in one case. Endometrial carcinoma cannot be excluded from estrogen-related neoplasms. However, the malignant transformation would depend on long-term exposure to excess estrogen in the absence of progesterone. The resulting cystic or adenomatous hyperplasia could be construed as a carcinoma precursor. Epidemiological evidence of DES as the cause of vaginal or cervical adenocarcinoma in young women is accepted. Prior to DES management of life-threatening pregnancies, such clear-cell adenocarcinomas were unknown in young people; in addition, they have not appeared in regions free of maternal DES use. One-third of the female offspring of mothers receiving DES before the 18th week of gestation and free of carcinoma present with a benign vaginal adenosis. (47 references)

5437 MOLECULAR ORGANIZATION AND EXPRESSION OF HERPES SIMPLEX DNA. (Eng.)

Roizman, B. (Dept. Microbiology and Biophysics, Univ. Chicago, Chicago, IL). *Adv Pathobiol* 5: 54-60; 1975.

The molecular organization of herpes simplex virus (HSV) DNA and the regulation of viral gene expression are reviewed. Evidence indicates that HSV DNA consists of two regions, L and S, containing 82% and 18% of the molecule, respectively. The sequences in the L and S regions may be designated as a-l-b'a'a'c'-s-ca, in which the prime letters represent an inversion of the sequences occurring at termini. It is hypothesized that the DNA extracted from virions consists of four kinds of molecules, differing only in the orientation of L and S regions relative to each other, and that the molecules arise by high frequency legitimate recombinations through the inverted regions or as a consequence of independent replication and random joining of the L and S regions. Nearly 50 polypeptides ranging in molecular wt from 15,000-300,000 are made at increasing rates of synthesis after HSV infection. Several lines of evidence indicate that viral polypeptides form several groups (α,β,γ), the synthesis of which is sequentially ordered and coordinately regulated. The synthesis of α polypeptides does not require prior protein synthesis, while that of the β and γ polypeptides does. Specifically, the initiation of synthesis of β polypeptides requires the presence in infected cells of functional α polypeptides and new RNA synthesis. Post-transcriptional processing of viral RNA appears to play a major role in the initiation of viral polypeptide synthesis. It is suggested that only functional messenger RNA sequences are transported to the cytoplasm and that transcripts that cannot function as messenger are either retained in the nucleus or rapidly degraded in the cytoplasm. It is possible that the same β or γ sequences are present on different transcripts during these periods. (22 references)

5438 ASSOCIATION OF HERPES SIMPLEX VIRUS WITH HUMAN TUMORS. (Ita.)

Terni, M. (Istituto di Microbiologia, Universita, Ferrara, Italy). *Recent Prog Med (Roma)* 56(5): 407-461; 1974.

In an effort to clarify the possible associations between herpes simplex virus and human tumors (e.g., cancer of the cervix), a review of the literature was compiled. There are a number of possible association mechanisms. For example, a simple accident may be responsible, whereby the virus is only one of many oncogenic factors transmitted venereally. The human genital herpes simplex virus may multiply more easily in tumor cells. There may also exist a carcinogenic viral role or a physiopathological condition (immunological or hormonal) that predisposes individuals with herpes to cancer. (192 references)

5439 THE EPSTEIN-BARR VIRUS AND HUMAN MALIGNANCIES. (Eng.)

Klein, G. (Dept. Tumor Biology, Karolinska Institutet, Stockholm, Sweden). *Adv Pathobiol* 5: 18-24; 1975.

The role of the Epstein-Barr virus (EBV) in the etiology of nasopharyngeal carcinoma (NPC) and African Burkitt's lymphoma (BL) is discussed. EBV-carrying BL cells grow into established in vitro lines more readily than explants from infectious mononucleosis or normal seropositive donors, and human lymphocytes grow as established lines only if they are derived from a lymphoma and/or carry the EBV-genome. Following in vitro infection with EBV, some virus-negative BL lines have been converted into carriers of viral DNA and viral antigen. This suggests that EBV-genome positive BL originates from a genome-carrying cell, which implies an immunologic or a cofactor relationship between virus and disease. Although EBV is capable of immortalizing B lymphocytes with a normal diploid karyotype in vitro, EBV-carrying malignancies in vivo involve genetic changes in addition. It is conceivable that a given genetic change, a highly specific chromosome-14 translocation in the case of BL, influences the obability of lymphoma induction by EBV and also by ier, unknown agents. It is also likely that EBV quires a special form of cellular competence before lly autonomous malignant cells can emerge. Although ere is no major geographic variation in the EBV-rrying status of NPC, only poorly differentiated anaplastic tumors appear to carry the viral nome. Preliminary evidence suggests that the NPC-sociated genome may be slightly different from the -associated genome. It may be anticipated that the lationship between EBV and NPC will resemble in inciple the situation postulated for BL. (58 referces)

40 TRANSFORMATION IN VIVO--A REVIEW. (Eng.) Epstein, M. A. *In: Oncogenesis and Herpesruses II. Part 2: Epidemiology, Host Response and ntrol. Proceedings of a Symposium held in Nuremrg, Federal Republic of Germany, 14-16 October 74.* International Agency for Res. on Cancer. (Lyon, ance): pp. 141-151; 1975.

has been recently discovered that herpesviruses e the etiological agents for tumors, and experints with nonhuman primates have revealed much out viral behavior in vivo. Human systems have own the pathology of herpes simplex virus type 2 d Epstein-Barr virus, and the knowledge of their thods of infection has increased. Further animal udies will provide more information on cell-virus teractions and show that more of these viruses use human tumors.

41 THE SERO-EPIDEMIOLOGY OF EPSTEIN-BARR VIRUS. (Eng.) Henle, W. (Div. Virology, seph Stokes, Jr. Res. Inst., Children's Hospital, iladelphia, PA); Henle, G. *Adv Pathobiol* 5: 5-17; 75.

roepidemiologic studies of Epstein-Barr virus 3V) in infectious mononucleosis (IM), Burkitt's mphoma (BL), and nasopharyngeal carcinoma (NPC) e reviewed. The presence of antibodies to EB viral psid antigen (VCA) in the sera of many children d most adults throughout the world indicates that V has a worldwide distribution. The close associaon between EBV and BL, IM, and NPC is suggested by gh anti-VCA titers in most patients. In addition VCA, there are three other EBV-related antigentibody systems: EBV-determined cell membrane antins (MA); the EBV-induced early antigens (EA); and e EBV-associated nuclear antigen (EBNA). Anti-VCA, ti-D (the EA diffuse component), and neutralizing tibodies appear in the serum early in the course IM, whereas anti-EBNA and anti-S (soluble comement-fixing antigen) develop weeks or months ter onset. Primary EBV infection in this disease pears to lead to a persistent viral carrier state the lymphoreticular system, antibodies to certain the EBV-related antigens being maintained throught life. It is unlikely that BL is an immediate nsequence of primary EBV infections, and BL among ucasian children is often unrelated to EBV. All rican BL patients develop antibodies to VCA, but t to the EA complex, and titers of anti-EBNA vary eatly. NPC, if caused by EBV, is a late event in viral carriers and additional factors must be involved in its genesis. The EBV-related antibody spectra and titers in NPC are related to the total tumor burden, and IgA antibody levels are often high. Other diseases characterized by high anti-VCA titers have immunosuppressive effects or require therapy by immunosuppressive compounds. Thus, immunosuppression may be able to activate persistent EBV infections. (10 references)

5442 IMMUNOLOGICAL AND BIOCHEMICAL ASPECTS OF CELLULAR TRANSFORMATION. CHAIRMAN'S INTRODUCTION. (Eng.) Burger, M. M. (Dept. Biochemistry, Biocenter Univ. Basel, Klingelbergstrasse 70, CH-4056, Basel, Switzerland). *Bibl Haematol (Basel)* (43): 48-49; 1976.

It is believed but not unequivocally established that transformation of a cell from its resting or normal state of growth to that of malignant growth will lead to a general alteration in an enzyme or structural protein that can be characterized biochemically. Immunology has distinguished between internal and surface antigens, the tumor or T antigen being the classical representative of antigens occurring inside the cell and tumor-specific transplantation antigens (TSTA) being the classical representatives of those antigens at the cell surface after transformation. At the genetic level, the question of how an antigenic molecule can be altered is still an open one, particularly in chemical transformation. Biochemical approaches to the transformation problem are widely scattered. Although the molecular biology of viral transformation has progressed and accumulated an enormous amount of data, efforts in the field of metabolism, cyclic nucleotides, cell adhesion, shape, motility, and anchorage are either very dissociated or still in their infancy. The only valid approach to the problem may be a multidisciplinary one (4 references)

5443 TRANSFORMATION AND THE CELL SURFACE. (Eng.) Ponten, J. *In: Cell Surfaces and Malignancy.* John E. Fogarty International Center for Advanced Study in Health Sciences and Natl. Insts. Health. (Bethesda, MD: September 11-13, 1974): pp. 197-213; 1975.

The biological aspects of the role of the cell surface in transformation are reviewed. Six types of eukaryotic cell transformation are considered: infinite growth, unrestrained growth, irregular growth, morphologic, chromosomal, and malignant types. Infinite growth transformation in an unstable species (mouse, rat, or hamster) is accompanied by chromosomal, unrestrained, irregular, morphologic, and malignant transformation. The value of unrestrained growth transformation (loss of contact inhibition of mitosis) as a sign of neoplasia-related permanent disturbance of cellular growth control is not yet clear. Irregular growth transformation is a largely qualitative transformation parameter, but it is an important marker for the focal effects of many oncogenic viruses on fibroblasts in vitro. Chromosome changes can occur without any disturbance of any of the other transformation parameters. Infinite growth (human lymphoblastoid cells are an exception) and, in most instances, malignant transformations are accompanied by chromosomal aberrations often in the form of mixoploidy and constant rearrangements within the karyotype. A demonstration of malignant transformation should include histological verification, determination of the size of the tumorigenic unit, and back transfer in vitro. In all the widely studied oncogenic DNA viruses, the transformation rate is low, and any comparison between cell populations before and after DNA virus transformation may be inadequate because of the badly understood selection of certain cells for transformation. Oncogenic C type RNA viruses have the advantage that, under appropriate conditions, they may transform all exposed cells within 24-48 hr; selection therefore becomes unimportant. Transformation in vitro has been achieved by chemical carcinogens, UV light, and x rays using cultivated cells from unstable species; there are no documented instances of such transformations in cells from stable species. There is considerable indirect evidence favoring the idea that all cells that show unrestrained growth transformation have altered membrane functions, at least with respect to transport of certain small molecules. It is not yet known if and how these alterations are related to malignancy. (59 references)

5444 TUMOUR IMMUNOLOGY: A GENERAL APPRAISAL. (Eng.) Klein, G. *In: Scientific Foundations of Oncology*. Symington, T.; Carter, R. L., eds. (Chicago: William Heinemann Medical Books, Ltd.): pp. 497-504; 1976.

It is important to distinguish between neoplastic proliferation that fails to encounter any immunological host recognition and overgrowth of tumor cells caused by a breakdown of an existing response. Genetic analysis has shown that specific responses are influenced by the action of Ir (immune responsiveness) genes that may act at the levels of antigen recognition by T cells, T-B cell cooperation, or B cell-dependent antibody formation. Single gene substitutions may account for the difference between effective and ineffective responder, or between responder and nonresponder. Since several animal species are resistant against the tumorigenic action of some widespread viruses, these viruses establish a stable, largely nonpathogenic interaction with their natural hosts. The question of antigenicity of most human tumors remains open because, although lymphocytotoxicity tests show tissue specific cross-reactivity patterns in vitro, the patterns have not been confirmed in vivo. A variety of cells may be involved, ranging from T cells through lymphocytes (mainly the null, 0 or K cells lacking both T and B cell markers) to monocytes and macrophages. The latency of dormant tumor cells represents the most important phenomenon in tumor immunology. Since serum blocking activity disappears after tumor removal, the antibody may be less important as a blocking factor than the antigen. Escape of tumor cells from immunological host controls may be due to immunodeficiency of the host, discordance in timing, immunoresistance, lack of antigenicity (in relation to the host's genotype), quantitative limitations in effector availability, or blocking of effectors. Whether the possible breakdown of host response is due to antigen emission from the tumor, insufficienc of a critical effector mechanism, suppressor cells, or any of the other escapes previously mentioned, remains to be established. If shedding of tumor antigen occurs, it will be important to determine whether different tumors differ in their antigen release and how this relates to their biological behavior. Prospective serological studies may help to discover whether the appearance of immune complexes precedes tumor development or is merely a secondary consequence. (45 references)

5445 IMMUNOLOGY AND CANCER DISEASE. (Fre.) Bordes, M. (Hopital des Armees H. Vincent, 2, rue du Stade, F 21000 Dijon, France). *Med Armees* 3(5): 393-398; 1975.

Immunosurveillance in cancer and its bases and failures (escape mechanisms) are reviewed. The incidence of spontaneous cancers in certain animal species is strongly influenced by all agents that modify the host's immunologic defenses. A similar effect is less frequent but also certain in humans; it is probable that numerous tumors that appear in the organism are eliminated before reaching the clinical stage. Studies of iso- or autografts in chemical- or virus-induced tumors support the concept of immunosurveillance, the basis of which depends on the antigenicity of the cancer cells versus the host, and on the immunologic response of the host. The absence of immunosurveillance is based on the failure of the immunologic defenses of the host (immunodeficiency, immunosuppression, immunologic tolerance), the defensive characteristic of the tumor cells, and the mechanisms that induce either a failure of adaptation of the immunologic reaction or a default of the host-tumor interaction. (29 references)

5446 FACTORS INTERFERING WITH IMMUNOLOGICAL REJECTION OF TUMORS. (Eng.) Baldwin, R. W. (Cancer Res. Campaign Lab., Univ. Nottingham, England); Robins, R. A. *Br Med Bull* 32(2): 118-123; 1976.

Several explanations can be proposed to account for the failure of tumor-associated cell-surface antigens to mediate tumor rejection responses: immunodeficiency of the host, "sneaking through", alteration in neoantigen expression and/or function, and abrogation of tumor immunity by host factors. Humora factors modifying cell-mediated immunity in the tumor-bearing host may include tumor-specific immune complexes involved in blocking reactions. Evidence to support this has been provided by studies involving dissociation of serum blocking factor into low- and high-molecular-wt component with subsequent loss in activity, which was restored on recombination; formation of immune complexes with enhanced blocking activity from solubilized tumor-specific antigen and antibody; and neutralization of tumor bearer serum blocking activity by the addition of excess tumor-specific antibody. An alternative pathway by which serum factors in the host might abrogat

ll-mediated immune rejection reactions involves
ecific desensitization (inhibition) of cytotoxic
mphoid cells through interaction with tumor anti-
n either in free form or as immune complexes. This
pe of inhibitory response has been demonstrated in
perimental animal tumors where the in vitro cyto-
xicity of sensitized lymph node or spleen cells
s abolished by preexposure to tumor bearer serum;
experiments where sera from patients with colon
rcinoma inhibited the cytotoxicity of peripheral
ood lymphocytes; in experiments where tumor-immune
mphocyte cytotoxicity was inhibited by tumor-
ecific antibody; and in studies where human tumor
tracts inhibited the in vitro cytotoxicity of
ripheral blood leukocytes for cultured tumor cells.
rculating tumor antigen and/or immune complexes
y play a biologically important role in the tumor-
st relation through interference with cell-mediated
munity. The in vivo relevance of these findings is
ing investigated via monitoring of serum factors
ring tumor growth and studies of the in vivo ef-
cts of humoral factors on the immunological rejec-
on of tumors. (66 references)

47 EXPRESSION OF IA ANTIGENS ON T AND B CELLS
AND THEIR RELATIONSHIP TO IMMUNE-RESPONSE
NCTIONS. (Eng.) Niederhuber, J. E. (Univ. Michigan
dical Center, Ann Arbor, MI 48109); Frelinger, J.
Transplant Rev 30: 101-121; 1976.

e tissue distribution and the relationship of the
rst serologically detected I region product, the
mune response region associated (Ia) antigens, to
ch immune functions as immune response gene con-
ol, mixed lymphocyte reaction, graft-versus-host
activity, antigen recognition, and T cell-B cell
T cell-macrophage interaction are reviewed. Several
nes of evidence now point to T cell expression of
antigens. Similarly, B cells have been identified
Ia reactive. The responsiveness of Ia negative T
lls to concanavalin A is prompted by Ia positive T
lls. It has been established that the major genetic
ntrol of the mixed lymphocyte reaction resides in
e I-A region of the H-2 complex and that the Ia
lecule is critical to the stimulation process. The
vitro humoral response has been inhibited by
ti-Ia antibody. Preliminary experiments indicate a
le for the Ia molecule in the recognition of anti-
n by the macrophage and the presentation of antigen
the T cell receptor, possibly as a new antigen-Ia
mplex. (36 references)

48 ANTIGENS IN TUMOURS. (Eng.) Freedman, S.
O. *In: Scientific Foundations of Oncology.*
mington, T.; Carter, R. L., eds. (Chicago: William
einemann Medical Books, Ltd.): pp. 505-514; 1976.

nclusive demonstration of tumor-specific antigen-
city is largely based on transplantation experiments
tween syngeneic animals; however, most principles
tumor-specific immunity were established with
logeneic animals. In tumor immunity the tumor-
ecific transplantation antigens (TSTA) behave like
eak antigens of the type responsible for graft
jection. Regardless of morphological similarities,
mors induced by different chemical carcinogens
vary widely in their immunizing capacity. On the other hand, oncogenic virus-induced tumors have TSTA common to all neoplasms induced by the same virus regardless of morphological differences. Adult cells may revert to the production of weakly immunogenic embryonic antigens following malignant transformation. Tumor-inducing agents may promote the transformation of normal cells into tumor cells as well as increase tumor survival by damaging the immune system. A number of nonendocrine and endocrine tumors, such as choriocarcinoma, may secrete hormones that serve as antigenic markers. Carcinoembryonic antigen (CEA) is possibly repressed during differentiation and then reappears in the corresponding malignant cells by derepressive dedifferentiation. CEA serum or plasma analysis might be valuable in the diagnosis of rectal, colon, lung, and pancreatic cancers; in monitoring the course of treatment; and in detecting recurrences. The reappearance of α_1-fetoprotein (AFP) in the sera of patients with hepatomas, testicular teratomas, and viral hepatitis (at a much lower level) is another example of the relationship between human embryonic and tumor antigens. Several other antigens that have been identified, including a leukemia-associated antigen (LAA), may prove useful for developing immunological tests for diagnosing cancer and monitoring treatment. (35 references)

5449 BLOOD GROUP MN PRECURSORS AS HUMAN BREAST CANCER-ASSOCIATED ANTIGENS AND ''NATURALLY'' OCCURRING HUMAN CYTOTOXINS AGAINST THEM. (Eng.) Springer, G. F.; Desai, P. R.; Scanlon, E. F. *In: Cellular Membranes and Tumor Cell Biology. Twenty-Eighth Annual Symposium on Fundamental Cancer Research, 1975.* (Baltimore: Williams and Wilkins Co.): pp. 325-335; 1975.

Investigations of the relationship between the human blood group MN antigens and breast cancer are summarized. A glycoprotein in the cell surface of a non-strain-specific subline of the ascites form of TA3 mouse mammary adenocarcinoma was found to be closely related to the human blood group N antigen. MN and the mouse mammary carcinoma antigens possess extremely high and specific *Vicia graminea* agglutinin inhibitory activity and both have β-D-galactose (Gal) and N-acetylneuraminic acid (NANA) as termini. Of all membrane-cytoplasm breast preparations tested, 6 nonmalignant breast gland lesions, 3 primary in situ, and 15 grossly malignant ductal and/or adenocarcinomas possessed blood group M, N, and *Vicia* active substances. The Thomsen-Friedenreich T antigen was demonstrable with human anti-T sera in chemically untreated malignant tissues but not in normal tissues or benign lesions. One absorption of human anti-T resulted in 70% removal of antibody by membranes from gross carcinoma and 53% by membranes from low-grade in situ carcinoma. The occurrence of severely depressed anti-T among 61 carcinoma patients (excluding breast carcinoma) showed a highly significant increase compared to similar aged individuals with no disease, suggesting that the breast carcinoma-associated antigen in man may be present in some other human malignancies. Anti-T titers in many breast cancer patients showed no difference from the average normal titer score of 23-24. Of 189 breast carcinoma patients, however, 61 (32.28%) had a severely and highly significant depressed anti-T score of 12 or less compared to 39/470 (8.3%) control patients without carcinoma and healthy individuals; 21.16% of the breast carcinoma patients had an anti-T score of 10 or less, compared to 5.19% and 3.62% of control populations. All individuals with extremely depressed anti-T titer scores had normal IgG, IgM, and IgA concentrations. The findings point to the indicator sensitivity of the T antigen in early malignant disease. (30 references)

5450 ANALYSIS OF MALIGNANCY AND ANTIGEN EXPRESSION BY CELL FUSION. (Eng.) Klein, G. (Karolinska Institutet, S 104 01 Stockholm 60, Sweden). *Fed Proc* 35(10): 2202-2204; 1976.

Previous reports have shown that the malignancy of various ascites tumors, including spontaneous neoplasms and those induced by chemicals or RNA and DNA viruses, is suppressed when they are fused with normal cells or with cells of low malignancy, provided the hybrid contains a relatively complete chromosome complement of both parents. When chromosomes are lost from the hybrids, there appears to be a preferential loss of markers derived from the low malignant parent. In a series of 11 hybrid tumors, only a hybrid produced by fusion of Moloney virus-induced YACIR lymphoma with the methylcholanthrene-induced MSWBS sarcoma showed certain complementation, expressed by a reduced incidence of takes in comparison with both parental tumor strains. Variants may arise by subchromosomal changes, and there is no reason why malignancy determinants could not be localized on different chromosomes, particularly in tumors of diverse etiology. In addition to complete and permanent histocompatibility antigen losses from heterozygous cells, a quantitative decrease of antigen expression can be encountered in nonspecific tumors. This is probably a more frequent reason for the development of immunoresistance than complete antigenic loss. (25 references)

5451 HUMAN CHORIONIC THYROTROPIN. (Fre.) Hennen, G. (Section d'Endocrinologie, Departement de Clinique et de Semeiologie medicale, Institut de Medecine, Universite de Liege, Belgium). *Rev Fr Gynecol* 71(3): 195-197; 1976.

Experimental evidence for the existence of a human chorionic thyrotropin (HCT) and its relationship to human chorionic gonadotropin (HCG) and pituitary thyrotropin (TSH) is reviewed. HCT has been extracted and partially purified by methods utilized for TSH. Immunologically, HCT seems to resemble animal TSH more than it does human TSH. HCT appears to be secreted by the placenta during normal pregnancy, but does not cause hyperthyroidism. Tumors of the placenta, the hydatidiform mole, and choriocarcinoma also secrete HCT. Patients with these tumors often develop a hyperthyroidism that may remain subclinical. The role of HCG and HCT in the syndrome is not yet defined. Neoplasms of nonendocrine tissue also may contain a thyroid-stimulating factor similar to or identical with HCT. The thyroid-stimulating activity may be elevated in the serum of some cases of nonendocrine neoplasm without inducing a clinical state of hyperthyroidism. (19 references)

5452 WHAT CAUSES LEUKEMIA? (Eng.) Bluming, A. (Univ. Southern California, CA). *Med Times* 104(8): 43-50; 1976.

The role of immunosuppression in the development of leukemia is discussed. The DNA polyoma virus, which rarely causes tumors in immunologically normal strains of mice, was found to induce tumors in neonatally thymectomized mice. Mice subsequently inoculated with lymph node or spleen cells from a normal mouse or from a mouse that previously rejected a polyoma tumor, recovered completely. An experiment with nude mice, which have no potential for cell-mediated immunologic activity, showed that mice given bovine serum albumin and immunosuppressive doses of azathioprine had a 66% incidence of malignant lymphomas. Nude mice given bovine serum albumin alone or azathioprine alone developed no lymphomas. Congenital immunodeficiency diseases and kidney allograft recipients represent two human clinical situations in which combined immunosuppression and antigenic stimulation are associated with an increas incidence of tumor development. In the former case, the incidence of malignant tumors, 80% of which are lymphomas, is 5%-10% or 1,000 times the expected rate among age-matched controls. Kidney allograft recipients have a malignancy rate 200 times that of controls; 50% of these tumors are lymphomas. Acute lymphoblastic leukemia, eosinophilia, and granulocytosis are also briefly discussed. It is suggested that both antigenic stimulation and immunosuppression are involved in the development of leukemia. (10 references)

5453 CHROMOSOMES AND CANCER. (Eng.) Hirschhorn K. (No affiliation given). *Birth Defects* 12(1): 113-121; 1976.

Some of the major recent findings on the relationship between chromosomes and malignancy are reviewe Studies with somatic cell hybrids suggest that certain tumors have specific chromosome alterations, i.e., either excess material resulting in the expre sion of malignancy or a deletion resulting in the lack of suppression of malignancy. Studies have shown that radiation induces both stable and unstable chromosome aberrations; the peak of leukemia about 5 yr after radiation and the appearance of other tumors approximately 20 yr after radiation ar associated with the stable alterations. Studies wit oncogenic viruses have shown in vitro neoplastic transformations of normal cultured cells, associate with chromosome damage. Several known and potential carcinogens have been shown to affect human chromosomes. These include streptonigrin, mitomycin C, radioactive chemicals such as gold and yttrium, cyclophosphamide, amethopterin, and polyvinyl chloride. Four diseases inherited as autosomal rece sives are associated with an increased susceptibili to various forms of neoplasia and apparently to spontaneous increases of chromosome breakage and rearrangement. These are Fanconi's anemia, the Blo syndrome, ataxia-telangiectasia, and xeroderma pigntosum. The classic association of the Philadelphia romosome with chronic myelogenous leukemia is scussed. It is suggested that chromosome damage of specific nature is associated with the primary ent responsible for neoplastic transformation of a ll. Studies of the localization of chromosome mage by new banding techniques may lead to a cor- lation between oncogenic agents and the specific mors they induce. (79 references)

54 INTER-RELATIONSHIP BETWEEN POLYCYTHAEMIA VERA, LEUKAEMIA AND MYELOID METAPLASIA. ng.) Modan, B. (No affiliation given). *Clin Haema- ol* 4(2): 427-439; 1975.

ie relationship between polycythemia vera (PV) and eukemia (LK) has been a controversial subject in ematology. The relationship between PV and myeloid etaplasia (MM), the association between the latter ondition and LK, and the interrelationship among ie three disorders within the myeloproliferative omplex have been less frequently considered. Al- nough the majority of acute LK cases in patients ith PV are associated with irradiation therapy, one annot rule out a possible relationship between the vo disorders. The available data could indicate a asically increased susceptibility of PV toward LK. ertain transitional patterns between the various nases of the myeloproliferative complex do exist. espite frequent diagnostic misclassification, MM is ne of the possible outcomes of PV, most probably ne that would have been reached if other complica- ions had not interceded. These conclusions are orroborated by the presence of nonspecific chromo- omal aberrations in MM that are similar to those in reated or untreated PV. Some studies suggest that cute LK does occur in the course of MM, in a fre- uency higher than that in the general population. owever, the evidence is still only suggestive. (82 eferences)

455 ATAXIA TELANGIECTASIA SYNDROME: CYTOGENETIC AND CANCER ASPECTS. (Eng.) Harnden, D. G. *n: Chromosomes and Cancer.* German, J., ed. (New ork: John Wiley and Sons): pp. 619-636; 1974.

he ataxia telangiectasia syndrome (AT) is of in- erest because of the immunological deficiency found n this syndrome and its possible relationship to an pparently increased incidence of cancer. The most ommon immune defect is a low level or complete bsence of IgA. Other defects include IgE deficiency, oor response by peripheral blood lymphocytes to itogen stimulation, poor or absent delayed hypersensitivity responses, poor homograft rejection, and artial or complete absence of thymus tissue. Abnor- nalities of other lymphoid tissues, and occasionally varian abnormalities, have been reported. The mode of inheritance for AT suggests a basic lesion. Data on malignancies of the reticuloendothelial system and other neoplasms in AT patients are tabulated. Cytogenetic findings on lymphocytes from 22 patients with AT, including four new cases, are also presented. The distribution of breakage and reunion points in AT is not random; however, firm conclusions about the significance of chromosome abnormalities cannot be made on the basis of the small number of cases fully investigated. (60 references)

5456 SEZARY'S SYNDROME. (Fre.) Prunieras, M. (Laboratoire de Recherches sur les Tumeurs de la Peau humaine, Fondation AD. de Rotschild, 29, rue Manin, 75019 Paris, France); Saglier, I.; Grupper, C.; Durepaire, R.; Flandrin, G. *Pathol Biol* 23(7): 553-565; 1975.

The diagnosis of Sezary's syndrome (SS) rests on the observation of a variable-sized lymphocyte with a grooved, folded, and lobulated nucleus; the lymphocytes of cases with this syndrome are negative for esterases and peroxidases. Cutaneous manifestations may also be present. The karyotype of the cell is usually normal, but the presence of hypertetraploid and hypodiploid cells suggests a blockage in the cell cycle some time after the S phase. Surface markers on the cell may be those of T cells, B cells, or neither. The various manifestations of these cells could be explained by the errors in protein synthesis due to age, a change in the antigenic character of the epidermal cells by age or chemical compounds, or the formation of mutagenic antigens in the skin resulting from x-ray exposure. Recent autoradiographic studies after incorporation of ^{3}H-thymidine have shown labeled lymphocytes in the skin of 3/4 cases of SS. Evidence suggests that the cutaneous manifestation of SS is comparable to a chronic graft versus host reaction. This suggests that an abnormality in the ectodermal part of the thymus could, with age, result in the production of antibodies that do not recognize the antigens of the epidermis. (56 references)

5457 ANEUPLOIDY AS A POSSIBLE MEANS EMPLOYED BY MALIGNANT CELLS TO EXPRESS RECESSIVE PHENOTYPES. (Eng.) Ohno, S. *In: Chromosomes and Cancer.* German, J., ed. (New York: John Wiley & Sons): pp. 77-94; 1974.

The hypothesis is proposed that malignant cells go through a functionally haploid phase and that aneuploidy is merely an overt consequence of the mechanism by which the cells express their recessive phenotype in high frequency. Evidence suggests that transformation of normal somatic cells to malignant cells does not require the acquisition of a new set of genes, but only that normally silent oncogenes become expressed. As for the regulatory switch that causes malignant transformation, the relative rarity of malignant tumors and the behavior of malignant-nonmalignant somatic hybrids suggests that it is genetically recessive in nature. Consequently, there may be a million- to ten million-fold difference in the probability of malignant transformation between a normal diploid somatic cell and an abnormal cell that has become hemizygous for pertinent gene loci. It is suggested, therefore, that an initial chromosome change that accompanies malignant transformation must necessarily be a deletion, as exemplified by the Philadelphia chromosome seen in human chronic myeloid leukemia. Once established, an aneuploid cell population might generate variants manifesting recessive phenotypes with unexpectedly high frequency, the frequency being independent of ploidy. Thus, aneuploid cells that are polysomic rather than monosomic would behave as though haploid. The frequent manifestation of recessive phenotypes in a predominantly polysomic cell population may result from somatic recombination due to crossing-over, and somatic segregation. A direct effect of ploidy on genetic regulatory systems would be to increase the regulator concentration to abnormally high levels. An increased regulator concentration should result in a mutantlike, noninducible phenotype in the case of repressive control, and in a mutantlike, constitutive phenotype in the case of activating control. (55 references)

5458 HISTORY AND PRESENT CONCEPTS OF THE DIFFUSE ENDOCRINE SYSTEM (D.E.S.). (Fre.) Pages, A. (Faculte de Medecine, 34000 Montpellier, France). *Rev Med* 16(29): 1993-1998; 1975.

Current concepts of the diffuse endocrine system, based on histopathological studies of carcinoid tumors of the appendix and ileum, are reviewed. The microscopic, topographic, embryologic, and functional aspects of the system are considered in relation to tumor pathology. The sequence of facts and hypotheses that led to the discovery of the endocrine system are described. Single nonfunctional tumors are manifested either by symptoms of mechanical origin (stenosis, occlusion, or compression) or by their metastases, and they are not distinctive clinically. Single functional tumors frequently cause overproduction of the hormone normally secreted by the host tissue, or the tumors themselves may even secrete a hormone normally secreted by another part of the diffuse endocrine system. Multiple tumors can have the same histopathology (digestive carcinoids) or they may have a different nature and structure but a common embryological origin (medullar thyroidal carcinoma, pheochromocytoma, mucous neurinomas). Alternatively, some may originate from the diffuse endocrine system and others from the classical endocrine glands (adenoma of the endocrine cells, duodenal cells, parathyroids, hypophysis, and islands of Langerhans). Anatomoclinical and physiopathological aspects are also reviewed. (8 references)

5459 NEUROBLASTOMA: REVIEW OF THE LITERATURE AND AN EXAMINATION OF FACTORS CONTRIBUTING TO ITS ENIGMATIC CHARACTER. (Eng.) Jaffe, N. (Sidney Farber Cancer Center, Children's Hosp. Medical Center, Harvard Medical Sch., Boston, MA). *Cancer Treat Rev* 3(2): 61-82; 1976.

Neuroblastomas are characterized by unparalleled complexities in their biological behavior. These include fatality within several months of diagnosis, the highest rate of spontaneous remission of any human malignancy, remission associated with maturation to a more differentiated cell type, and a maximum opportunity for survival in children under 1 yr. Neuroblastoma is the most common extracranial malignant solid tumor in infancy and childhood, and affects males slightly more than females. Its etiology is unknown, but a substantial proportion of cases seem to arise in utero. The sites commonly affected are the adrenal glands and the sympatheti ganglia of the neck, posterior mediastinum, retroperitoneum, and abdomen. Cumulative mortality curv show a 50% mortality within 6 mo of diagnosis. Biochemical determinations can be a useful index of response to treatment. Surgery and radiation thera appear to have reached their maximum potential but chemotherapy may produce some response in cases of disseminated neuroblastoma. However, favorable responses are usually temporary. It is hoped that immunotherapy or the use of tumor maturation facto will prove more successful in the future. (207 ref ences)

5460 MALE BREAST CANCER: A REVIEW. (Eng.) Mey kens, F. L. (Medical Breast Cancer Secti Medicine Branch, NCI, NIH, Bethesda, MD 20014); Tormey, D. C.; Neifeld, J. P. *Cancer Treat Rev* 3(2 83-93; 1976.

The clinical features of breast cancer in men are central lump frequently associated with fixation o a nipple abnormality; usually in the seventh decad Altered hormonal metabolism, gynecomastia, and Kli felter's syndrome appear to play a role in the development of the disease. The role of exogenous estrogens, infectious orchitis, radiation, and her edity is less certain. Radical mastectomy in early cases offers an excellent chance of long-term survival. Orchiectomy, adrenalectomy, and hypophysect are associated with high response rates with long remission durations in advanced cases. The role of additive hormones has not been defined, but favora responses to estrogens have been noted in some patients. The overall survival of men with breast cancer appears to be slightly less than that of women with comparable stages of disease. Investiga tion of men with breast cancer may help to further refine the hormonal treatment of the female diseas (104 references)

5461 PRIMARY HEPATIC TUMORS IN CHILDHOOD. (En Ishak, K. G. (Div. Hepatic Pathology, Armed Forces Inst. Pathology, Washington, DC). *Pro Liver Dis* 5: 636-667; 1976.

The epidemiology, clinical manifestations, histolo prognosis, etiology, and pathogenesis of the more common primary hepatic tumors of childhood are dis cussed. The material is based on personal clinical experience and reports in the literature. Tumors o the liver in infancy and childhood are relatively rare, although some are peculiar to this age group (e.g., mesenchymal hamartoma, infantile hemangioen thelioma, hepatoblastoma, embryonal rhabdomyosarco Striking sex differences are apparent in the incidence of some tumors. The most common mode of pres tation of hepatic tumors in children is progressiv abdominal enlargement due to hepatomegaly, with or without a palpable mass. Other manifestations may include weight loss, gastrointestional symptoms, acute abdominal emergency due to hemoperitoneum fr rupture, obstructive jaundice, congestive heart failure, and/or portal hypertension. Diagnosis may be aided by an α-fetoprotein determination and rad graphic studies, but definitive diagnosis ultimate sts on exploration and open biopsy, which should t be delayed unless necessary. The following tumors e discussed in detail: nodular hyperplasia of the ver, hepatocellular adenoma, hepatoblastoma, hepato- llular carcinoma, mesenchymal hamartoma, cavernous mangioma, infantile hemangioendothelioma, embryonal abdomyosarcoma, undifferentiated sarcoma, and ratoma. (114 references)

462 PIGMENT NEOPLASMS OF THE VASCULAR SYSTEM OF THE HUMAN EYE. (LITERATURE REVIEW ON RIGIN, ETIOLOGY AND PATHOGENESIS). (Rus.) Vit, V. . (V. P. Filatov Odessa Scientific Res. Inst. Eye iseases and Tissue Therapy, Odessa, USSR). *Oftalmol h* 3(1): 57-64; 1976.

he literature on the pathology and treatment of igmented vascular tumors of the eye is reviewed. he subjects covered include the neuroectodermal rigin of the tumors, the genetic aspects of elanoblastomas, the role of solar radiation in he pathology of melanomas, the role of nevi and elanosis in the formation of melanoblastomas, umor immunology, and the characteristics of the etastatic process. Preliminary investigations of he response of melanoblastomas to immunotherapy re noted. (75 references)

463 EPIDEMIOLOGY OF TUMORS IN CHILDHOOD. (Ger.) Erdoes, Z. (Medizinische Universitaet Semmel- eis, Budapest, Hungary). *Acta Paediatr Acad Sci ung* 16(2): 163-169; 1975.

he global epidemiology of pediatric tumors is eviewed relative to high mortality rather than high ncidence. Malignancy is most frequent in the first yr of life, decreasing between ages 6 and 19 before ising to original levels after 20 yr; this curve is ndependent of sex. Leukemia and retroperitoneal umors comprise 60% of all malignancies. Contrary to revailing findings, the Hungarian statistics between 947 and 1966 show no increase in total number of umors or malignant tumors, including leukemia. These data may not be accurate and may reflect a eed for increased surveillance.) The highest tumor ncidence in Hungary is in a border area adjacent to ustria, whose tumor frequency is among the world's ighest. (10 references)

5464 EPIDEMIOLOGY OF GASTROINTESTINAL TUMORS. (Ger.) Friedl, H. P. (Institut fuer Krebsforschung, Universitaet Wien, Borschkegasse 8a, A-1090 Vienna, Austria); Karrer, K. *Med Klin* 71(21): 888-894; 1976.

Aspects of the global incidence of gastric, colon, and rectal carcinoma and the etiology of gastrointestinal cancer are reviewed. Data from 24 countries between 1950 and 1967 show a significant global decrease in mortality from gastric carcinoma. The reduction in nations of low gastric cancer morbidity (US, Canada, Australia, and New Zealand) was proportional to that in nations with high morbidity (Chile, Finland, Iceland, Poland, and Austria). Male mortality rates generally exceed female rates. There was a clear geographical separation within circumscribed land masses; e.g., between the north-central and southern states in the US. Even smaller countries showed significant regional differences, especially between urban (lower) and rural (higher) mortality. This was not true for the US, where socioeconomic status at any location will vary inversely with risk. Emigrants showed a lower incidence than that of the parent population; their children had frequencies compatible with those of the natives of the adopted country. Countries and regions with low stomach cancer mortality were also those with high rates of colon and rectal cancer mortality. Again, there was an inverse relation between risk and socioeconomic status, especially in low-risk countries, but it was less unequivocal for colon than gastric cancer. The multifactorial cause of gastrointestinal carcinoma was also explored. Heavy emphasis was given to the role of exogenous factors, especially the life-style implicit in socioeconomic conditions. Monotonic or deficient diet was linked to premalignant changes in the gastric mucosa, such as chronic atrophic gastritis. In the US, there was a drop from 70% to 53% in the occurrence of intestinal type tumors or well-differentiated adenocarcinoma between 1940 and 1960. The etiology of rectal cancer is more equivocal than that of colon carcinoma, but there is an epidemiological similarity. Particular reference is to the high proportion of anaerobic flora and the low dietary fiber in persons of high-risk areas (US and Great Britain). A global correlation between cardiac infarction of atherosclerotic origin and colon cancer is cited. Endogenous and exogenous factors linked to gastrointestinal carcinoma can be affected genotypically and phenotypically. Evidence from population migration epidemiology would tend to confer greater weight on environmental factors. (26 references)

5465 METASTASIS REVISITED. (Eng.) Fisher, B.; Fisher, E. R. *In: Fundamental Aspects of Metastasis*. Weiss, L., ed. (Amsterdam: North Holland Publishing Co.): pp. 427-435; 1976.

The initial stage of metastasis is an important but not entirely universal feature distinguishing benign from malignant tumors, and a variety of hormonal or other host factors may be involved. Dissemination, the second stage of metastasis, appears to be achieved through unification of the two vascular systems, blood and lymph. This would account for the sporadic or cyclic appearance of tumor cells in the circulating blood of experimental animals and man. The final stages are concerned with lodgment, attachment, and the growth of circulating tumor cells. One factor in the adherence of tumor cells to the vascular endothelium could be the immediate entrapment of cells within a fibrin clot. The inconsistency of metastasis development in patients with seemingly similar tumors remains a question. Experimental data have indicated that trauma is a factor and that the absence of metastases does not indicate a lack of tumor cell development. Animals can harbor tumor cells for long periods of time. Tumor cells have the capacity to traverse lymph nodes. Recent findings indicated that metastases are unable to enhance immunity via their own regional lymph nodes. Other studies have shown that the regional lymph node may play an essential role in the initiation and maintenance of tumor immunity. Thus, immunity does play a significant role in tumor metastases. Lastly, the tumor cell cycle seems related to tumor mass. The larger the tumor cell population, the longer the cycle and the less effective is chemotherapy. Surgery, radiation, or drug therapy all shorten the cell cycle and make chemotherapy more effective. (36 references)

5466 THE EFFECTIVENESS OF LYMPH NODES AS FILTER CELLS IN METASTASIZING MELANOMA. (Ger.) Noedl, F. (Hautklinik der Universitaet des Saarlandes, D-6650 Homburg/Saar, West Germany). *Arch Dermatol Forsch* 255(3): 237-243; 1976.

The mechanical inadequacy of lymph node filtration in metastatic cancer, especially melanoma, was reviewed. Particular emphasis is on the fact that negative lymph node histology does not exclude progressive melanoma cell (MC) colonization. MC colonies are known to show central degeneration with or without evidence of hemorrhage, especially in extensive metastases. Recent histological data also show MC clusters on strands embedded in a finely reticulated fiber network in the eosinophilic areas of nodular tissue. The MC is spindle-shaped and its nucleus chromatin-rich. Few plasma cells or lymphocytes are present. This stromal reaction is not found in the primary tumor. It is highly doubtful that the MC sequestered in the network could escape. However, the MC assembly and its network are absent in many other nodes. In the latter case, the MC are diffusely distributed, their nuclei pycnotic and mitoses frequent; MC vicariously line the larger lymphatics. (7 references)

5467 STUDIES ON NORMAL AND NEOPLASTIC LIVER CELLS IN CULTURE: CONTACT BEHAVIOR, CELLULAR COMMUNICATION AND TRANSFORMATION. (Eng.) Borek, C. *In: Gene Expression and Carcinogenesis in Cultured Liver*, Gerschenson, I. E.; Thompson, E. B., eds. (New York: Academic Press): pp. 62-93; 1975.

The behavior of differentiated epithelial cells after transformation in vitro was compared with in vivo epithelial changes (carcinoma). Three cell lines were used: normal buffalo rat hepatocytes (RLB); transformed RLB cells (RLT); and a Morris hepatoma cell line (H5123). High saturation density and nutritional deprivation for 30-40 days produced the RLT line. Karyotypic analysis revealed that the RLB line was essentially diploid (42 chromosomes), with 5% tetraploid; the RLT cells showed an increase in chromosome number (60 or 80 per cell), possibly due to doubling followed by random loss. The H5123 cells were pseudodiploid, with 44-52 chromosomes per cell. RLB cells are flat, strongly adherent, and will not replicate in suspension but will form monolayers. RLT cells showed a decreased adhesiveness to the growth surface and to each other, similar to H5123. RLT and H5123 cells were not inhibited by contact with RLB. RLB cells exhibited ion communication at permeable intercellular junctions; no ion current flow was detected between osculating RLT and H5123 cells. In contrast to RLB cells, RLT and H5123 cells could grow in suspension, could form colonies in 0.33% agar, were agglutinable by concanavalin A and wheat germ agglutinin, had no tight junctions, could replicate over normal cells, and could produce tumors in vivo. The transformation of liver cells by nutritional stress into malignant epithelioid cells and the similarities between these cells and Morris hepatoma cells have important implications for the study of in vivo malignancies. (47 references)

5468 BIOCHEMICAL, AUTORADIOGRAPHIC, AND ELECTRON MICROSCOPIC STUDIES OF ADULT RAT LIVER PARENCHYMAL CELLS IN PRIMARY CULTURE. (Eng.) Pariza, M. W.; Yager, J. D.; Goldfarb, S.; Gurr, J. A.; Yanagi, S.; Grossman, S. H.; Becker, J. E.; Barber, T. A.; Potter, V. R. *In: Gene Expression and Carcinogenesis in Cultured Liver*. Gerschenson, I. E.; Thompson, E. B., eds. (New York: Academic Press) pp. 137-167; 1975.

A method of culturing rat liver parenchymal cells in primary monolayers was developed to overcome the disadvantages of using freshly isolated hepatocytes in suspension culture. The relationships between various biochemical measures of viability, the conditions of culture, and cell morphology are dealt with. The desirability of monitoring protein and RNA labeling as an objective test of improvements in cell isolation and culture conditions was emphasized The experiments were analyzed from two aspects: incorporation of radioactive label on a whole culture and per milligram of DNA and on the basis of percent of individual cells labeled, as determined by autoradiographic techniques. Cells were cultured in serum-free modified Waymouth's MB 752/1 medium (plus oleate, bovine serum albumin, and amino acid supplements) with insulin (0.5 g/ml) on collagen-coated dishes. Rapid cell attachment was produced that seemed complete 2 hr after inoculation. Changing the medium 4 hr after inoculation enhanced viabi ity, as measured by ^{3}H-leucine incorporation. Immediately after cell isolation the functional properties of the cells were not optimal, but they improved with time. The most favorable time for studying protein and RNA synthesis and some enzyme activities (notably, ornithine decarboxylase) is 20-60 hr in culture. The incorporation of RNA precursors into trichloroacetic acid-insoluble, KOH-hydrolyzable material may be a more sensitive measure of functional recovery than incorporation of protein precursors. (34 references)

5469 CHEMISTRY OF PROLACTIN. (Eng.) Lewis, U. J. (Scripps Clinic and Res. Foundation, La Jolla, CA 92037). *Pharmac Therap B* 1(3): 423-435; 1975.

A brief review is presented of the isolation, purification, physicochemical properties, and effects of chemical modification on the biological properties of the pituitary polypeptide hormone, prolactin. The molecular wt of the ovine and porcine hormones were found by ultracentrifugation to be 24,200 and 25,000, respectively, and porcine prolactin had an

electric point of pH 4.97. The complete amino
l sequence has been reported for the prolactins
three species (ovine, porcine, and bovine); there
n 82% homology between the ovine and porcine
cies. Nitration of all seven tyrosine residues or
conversion of lysines to homoarginine did not
tivate the hormone (on the basis of pigeon crop
mulating activity). Activity was diminished by
lation with performic acid, reduction with cys-
ne or thioglycolic acid, acetylation with ketene,
by esterification of the carbonyl groups. Samples
prolactin often show some degree of heterogeneity
analyzed by gel electrophoresis unless special
cautions are taken during purification. Factors
tributing to the heterogeneity include the alkaline
midation of asparaginyl residues, aggregation,
enzymic proteolysis. (106 references)

) TRANSPORT THROUGH THE PLASMA MEMBRANE AND THE REGULATION OF CELL GROWTH AND FUNC-
N. (Eng.) Metcalfe, S. M.; Warren, G. B.; Met-
fe, J. C. *In: Cell Surfaces and Malignancy. Meet-
Held in Bethesda, 11-13 September 1974.* Mora,
T., ed. John E. Fogarty International Center for
anced Study in Health Sciences; Natl. Insts.
lth. (Bethesda, MD): pp. 127-145; 1975.

mination of the effects of various lipid-soluble
ecules on growth of cultures of Rhesus monkey
ney (MK) epithelial cells revealed that revers-
e inhibition occurred through a nonspecific (hydro-
bic) interaction with the cells. There was an
roximately linear relationship between inhibition
MK cell metabolism and human erythrocyte stabiliza-
n for diverse perturbing agents. The nonspecific
ibition of cell growth is largely determined by
concentration of the perturbing agent in the
get cell membrane. For nontoxic agents, the erythro-
e stabilization test was a reliable guide to the
centration of an agent required to cause revers-
e inhibition of cell growth. This correlation
ween lipid solubility and inhibition of MK cell
wth should apply to a wide range of cell types at
ilar concentrations of nontoxic molecules. Data
m a study of effects of different narcotics on
a cell growth are cited to support this statement.
a are also presented to demonstrate that cellular
abolism is depressed by a decrease in the perme-
lity of the membrane to essential ions or solutes
ulated by transport proteins in the membrane. As
onsequence, all of the transport proteins in a
gle type of membrane, or in other plasma membranes,
l be affected at approximately the same concentra-
n range of a perturbing agent. A protein function
the membrane environment responds to perturbation
the lipid bilayer fluidity in either direction
h a decrease in functional efficiency of the
tein. Thus, perturbing agents having opposing
ects on a membrane's fluidity should tend to
cel each other in their effects on the function
the membrane protein, by leaving the protein
formation in a state similar to no perturbation.
nges in membrane transport induced by specific
and-receptor interactions are caused entirely
ferent mechanisms from those suggested here for
specific inhibition of membrane transport proteins.
Suggestions are made for testing the hypothesis that the formation of patches may represent the aggregation of receptors on, or associated with, functional monomeric units of a calcium transport protein, and that this aggregation of these functional proteins into a tight cluster modulates their function. (27 references)

5471 COMMENTARY: THE BIOLOGY AND MECHANISM OF STEROID HORMONE RECEPTOR INTERACTION WITH THE EUKARYOTIC NUCLEUS. (Eng.) Buller, R. E. (Baylor Coll. Medicine, Houston, TX 77025); O'Malley, B. W. *Biochem Pharmacol* 25(1): 1-12; 1976.

Evidence is presented that steroid hormones undergo noncovalent binding with cytoplasmic proteins (receptors), followed by translocation to nuclei and binding to acceptor sites on interphase chromosomes. Experiments in which rats were injected with radioactively labeled hormones showed that some hormones were retained preferentially by certain tissues; autoradiography of these target tissues demonstrated that the steroid was preferentially accumulated by the target cell nuclei. Experiments with various mouse strains and tumor lines have provided evidence that steroid hormones bind to nuclear acceptor sites through reactions dependent on specific receptors. Some steroid antagonists bind to the cytoplasmic receptor and prevent nuclear uptake of the complex. Other antiestrogens (CI-628, nafoxidine, and clomiphene) bind to the cytoplasmic receptor and are translocated to the nucleus in an apparently normal fashion; these antiestrogens appear to block cytoplasmic resynthesis of receptors. The actual chromatin-associated nuclear acceptor sites may consist of a DNA backbone structurally modified by chromatin-associated nonhistone proteins. Nuclear retention, rather than just nuclear binding, may determine cellular responses. Cell hybridization studies showed that the presence of receptors is a necessary but not sufficient condition for hormone responsiveness. Steroid-induced proteins have been identified in several systems, including the chick oviduct, in which ovalbumin synthesis is estrogen-mediated. Two models of receptor-mediated transcriptional control in eukaryotic organisms are proposed; they may explain how nuclear accumulation of steroid hormones elicits specific new RNA synthesis. (189 references)

5472 CHAIRMAN'S INTRODUCTION: PREPARATIONS FOR GROWTH IN THE FIBROBLAST. (Eng.) Green, H. *In: Cell Surfaces and Malignancy. Meeting Held in Bethesda, 11-13 September 1974.* Mora, P. T., ed. John E. Fogarty International Center for Advanced Study in Health Sciences; Natl. Insts. Health. (Bethesda, MD): pp. 73-81; 1975.

During the transition from the resting to the growth state, fibroblasts show increase in both ribosome number and transfer RNA (tRNA) content. The increases are due primarily to increased rates of formation, which require increased rates of transcription of pre-ribosomal RNA and pre-tRNA. The cells also contain a high message to ribosome ratio; fast-growing cells have a poly A (+) mRNA/rRNA ratio of nearly

3%. The messenger RNA (mRNA) content of serum-stimulated cells increases soon after serum stimulation, while there is a fixed overall rate of HnRNA synthesis. The mRNA increase is attributed to an increase in conversion of poly A (+) HnRNA to poly A (+) mRNA. In serum-stimulated 3T6 cells, increased transcription of pre-rRNA and pre-tRNA may be detected after about 10 min, increased processing of poly A (+) HnRNA to poly A (+) mRNA in less than 2 hr, increased mRNA content of cytoplasm and increased rate of protein synthesis in less than 4 hr, and increased ribosome number in about 6 hr. A general increase in the rate of nucleoplasmic transcription is not necessary for the transition to the growing state, since the fibroblast nucleus dose not increase in size during transition and its total rate of transcription of HnRNA does not increase prior to DNA synthesis. These various changes that are brought about by the mitogenic stimulus are directly related to the growth process. Others, such as changes in membrane permeability and increasing activity of ribonucleotide reductase, are less significant for the process. Essential for the transition are increases in the protein-synthesizing machinery; these include a 60% or 2.5-fold increase in ribosomes and tRNA per unit of DNA due to increased formation and decreased destruction, and a 2.3- to 4.0-fold increase in mRNA per unit of DNA due to increased formation. Fibroblasts are sensitive to changes in synthesis rates and must be able to make comparative measurements so that they can adjust these rates accordingly. It may be possible to determine how this coordination is accomplished by preventing specific parts of the total growth preparation program from responding to mitogenic stimulation and observing the effect on other parts of the program. (44 references)

5473 CHROMATIN STRUCTURE AND FUNCTION IN PROLIFERATING CELLS.

(Eng.) Baserga, R. (Dept. Pathology, Temple Univ. Health Sciences Center, Philadelphia, PA 19140); Nicolini, C. *Biochem Biophys Acta* 458(1): 109-134; 1976.

The characteristics of isolated chromatin and the chromatin in resting, proliferating, and transformed cells are reviewed. Although not identical to that in living cells, isolated chromatin preserves some of the specific functional characteristics of living chromatin, both quantitatively and qualitatively. The characteristics of isolated chromatin are discussed in terms of template activity, circular dichroism spectra, dye binding, the effect of shearing, and linear dichroism. The structure of isolated chromatin has been studied by electron microscopy, x-ray diffraction, neutron diffraction at low angle, nuclear magnetic resonance, viscosity and thermal denaturation, fractionation, and reconstitution. Chromatin changes in continuously dividing cells, resting cells stimulated to proliferate, aging cells, and transformed cells are discussed, as is the significance of chromatin change during the cell cycle. Extraction of chromatin with low concentrations of NaCl abolishes the differences between the chromatins of resting and stimulated cells; the reasons are considered. It is concluded that chromatin structure and function are exceedingly sensitive to changes the proliferative state of a cell, and that these differences are unlikely to be artifactual. Differences between chromatins of normal and neoplastic cells can also be detected, but these are largely related to differences in the extent of cell proli eration. The changes occurring in the chromatin of proliferating cells might be profitably used to elucidate chromatin structure. (206 references)

5474 REGULATION OF CELL CYCLES.

(Eng.) Voorhee J. J. (Univ. Michigan Medical Sch., Ann Arbor, MI 48109); Duell, E. A.; Chambers, D. A.; Marcelo, C. L. *J Invest Dermatol* 67(1): 15-19; 197

The current cell cycle models and the various syst used to elucidate the control mechanisms involved gene expression and differentiation are discussed. The most important phase of the cell cycle with respect to controlling mechanisms appears to be gap- (G_1), the phase between the end of mitosis and initiation of DNA synthesis. The operon model for gene control in prokaryotes is summarized and the role of cAMP in derepression is explained. cAMP must bi to a particular protein called catabolite gene activator protein, and this complex along with core RNA polymerase and the sigma factor attach to the promoter site to permit derepression. A similar although more complicated operon system may operate in eukaryotes. Differentiation is thought to involv some type of selective repression of gene activity instead of actual loss of genetic material. Prolife ative disease states may be due to the derepression of certain proliferative genes. Several possible co trolling mechanisms of selective gene repression ar discussed, including: cell surface receptors and messengers, soluble factors, cyclic nucleotides suc as cAMP and 3',5'-cyclic guanosine monophosphate (cGMP), and prostaglandins. In general, cAMP inhibi cell proliferation and cGMP stimulates that activit Increases in prostaglandin activity are associated with cell proliferation. No single model system see ideal for studying all phases of the cell cycle and the control of gene expression; however, the advantages of several systems are briefly discussed. (39 references)

5475 PROTEIN SYNTHESIS AND EXCRETION IN SINGLE CELL SUSPENSIONS FROM LIVER AND MORRIS HEPATOMA 5123 TC.

(Eng.) Schreiber, G.; Schreiber, M. *In: Gene Expression and Carcinogenesis in Cultured Liver.* Gerschenson, L. E.; Thompson, E. B., eds. (New York: Academic Press, Inc.): pp. 46-61; 1975.

A technique involving lysis of the intercellular matrix of liver or hepatoma 5123 tc with 0.05% collagenase and 0.1% hyaluronidase to prepare single cell suspensions is reviewed. The preparation procedure leads to the loss of the capacity for concentrative uptake of amino acids; cell membranes becom freely permeable. Continuous recycling perfusion with the enzymes seems to be superior to other methods for separating liver cells, but is unnecessary for hepatoma cells. The characteristics of liver and hepatoma cells in such suspensions are

scribed. Protein synthesis in liver cells was
ximum at pH 7.17, varied with ion concentration in
e medium, and was temperature-dependent between
-37 C. For hepatoma cells there was a broader pH
timum, and ion concentration had no effect within
range of 0-116 mM for K^+, 0-20 mM for Mg^{++}, and
10 mM for Ca^{2+}. The incorporation of L-$[1-^{14}C]$-
ucine into protein of liver or hepatoma cells was
hibited by very low doses of antibiotics such as
romycin. Synthesis of serum albumin and fatty acid
nthetase by isolated liver cells has been reported.
patoma cells incorporated $[6-^{14}C]$-orotate, $[2-^{14}C]$-
acil, and $[2-^{14}C]$-uridine into their RNA, while in
ver cells only the radioactive uridine was effec-
vely incorporated. (31 references)

76 AUTOXIDATION IN VIVO. (Eng.) Wolman, M.
(Tel Aviv Univ. Sackler Sch. Medicine,
l-Hashomer, Israel). *Isr J Med Sci* 11[Supplement]:
-57; 1975.

rious features of the autoxidation process in
vo are reviewed. Among the aspects discussed are
jected and aspirated exogenous lipids; autoxida-
on in lipid-rich tissues; the effects of peroxidized
pids on animals and humans; the autoxidation of
pids in relation to aging, mitotic activity and
pair; the functional significance of lipid peroxida-
on in cell membranes; and the effects of lipid
roxides and lipid oxidation on membrane structure
d enzymes. (No references)

77 DEFINITIONS AND TERMINOLOGY IN CANCER
(TUMOR) ETIOLOGY: AN ANALYSIS AIMING AT
OPOSALS FOR A CURRENT INTERNATIONALLY STANDARDIZED
RMINOLOGY. (Eng.) Hecker, E. (Deutsches Krebsfor-
hungszentrum, im Neuenheimer Feld 280, D-6900
idelberg, West Germany). *Int J Cancer* 18(1): 122-129;
76.

concise system of cancer terminology is proposed.
e term ''carcinogenesis'' is suggested for use in
e broadest sense to describe the generation of
oplasia. ''Carcinogen'' may be used for causative
ents in carcinogenesis provided they are identi-
ed unequivocally. For those agents not so identi-
ed, ''carcinogenic factor'' may be used. These
ents can induce carcinogenesis in one or more of a
st's tissues; they display ''tissue specificity.''
ch an agent may be exogenous or endogenous in
igin and physical, chemical, or viral in nature.
Carcinogenic processes'' can define the multiplici-
of possible patterns of exposure of the host or
rget tissue according to the kind(s), number(s),
d sequence(s) of carcinogens. The third fundamen-
l variable in carcinogenesis (in addition to car-
nogen and carcinogenic process) is ''host or tar-
t tissue predisposition.'' This disposition may be
born or acquired and it exists prior to the start
any carcinogenic process. A carcinogenic process
itiated by unifactorial exposure, either single or
peated, of a host or target tissue is ''solitary
rcinogenesis''; a carcinogen so involved is a
solitary carcinogen.'' Those processes initiated
multifactorial exposure are ''syncarcinogenesis.''
xposure of the host or target tissue to a solitary carcinogen followed by one or more agents may also result in inhibition or ''anticarcinogenesis'' of the carcinogenic response. ''Pluricarcinogenesis'' is carcinogenesis by simultaneous or sequential exposure to one solitary, or one incomplete, carcinogen followed by another solitary carcinogen, no matter how much later in life. ''Cocarcinogenesis'' is carcinogenesis by simultaneous or sequential exposure to a subcarcinogenic dose of a solitary, or incomplete, carcinogen and another intrinsically noncarcinogenic and noninitiating factor. This latter factor is a ''cocarcinogen.'' Solitary carcinogens and cocarcinogens are first- and second-order carcinogenic risk factors, respectively. (44 references)

5478 MOLECULAR BASIS OF MALIGNANCY. (Eng.) Weber, G. (Lab. Experimental Oncology, Indiana Univ. Sch. Medicine, Indianapolis, IN); Prajda, N.; Williams, J. C. *Adv Tumour Prev Detect Charact* 3: 3-14; 1976.

The discovery and documentation of an ordered pattern of biochemical imbalance that forms the molecular basis of neoplasia are reviewed. With the molecular correlation concept as an experimental and conceptual approach, the operation of an imbalance was recognized in the metabolism of carbohydrates, pentose phosphates, purines, pyrimidines, DNA and membrane cAMP. The metabolic imbalance was elucidated through focusing on the need for a spectrum of tumors of the same cell type; the necessity of analyzing opposing key enzymes in antagonistic and competing metabolic pathways; and the need to compare the metabolic picture in neoplasms with the appropriate and meaningful control tissues. The molecular basis of neoplasia was documented in a spectrum of hepatomas of different growth rates. The biochemical alterations were classified according to their relation to the neoplastic transformation itself or their link to the degrees of malignancy. The biochemical alterations in cancer cells were interpreted as pleiotropic changes involving genetic or epigenetic alterations entailing a reprogramming of gene expression. The alterations in the key enzymes of the hepatoma system have a direct bearing on the design of chemotherapy, because they are promising targets in the present chemotherapy in man and because the molecular pattern of imbalance here also applies to other neoplasms in the rodent and to primary hepatoma in man. (16 references)

5479 REPORT OF DISCUSSION GROUP NO. 12: MUTAGENESIS ASSESSMENT. (Eng.) de Serres, F. J. *In: Carcinogenesis Testing of Chemicals. Proceedings of a Conference on Carcinogenesis Testing in the Development of New Drugs held in Washington, DC, May 23-25, 1973.* Golberg, L., ed. (Cleveland: CRC Press, Inc.): pp. 101-107; 1974. (16 references)

5480 TOBACCO. (Eng.) Wynder, E. L.; Mabuchi, K.; Hoffmann, D. *In: Cancer Epidemiology And Prevention. Current Concepts.* Schottenfeld, D., ed. (Springfield: Charles C. Thomas): pp. 102-125; 1975. (97 references)

5481 DESIGN OF EXPERIMENTS TO DETECT CARCINOGENIC EFFECTS OF DRUGS. (Eng.) Peck, H. M. *In: Carcinogenesis Testing of Chemicals. Proceedings of a Conference on Carcinogenesis Testing in the Development of New Drugs held in Washington, DC, May 23-25, 1973.* Golberg, L., ed. (Cleveland: CRC Press, Inc.): pp. 1-13; 1974. (38 references)

5482 INTERPRETATION OF TEST RESULTS IN TERMS OF SIGNIFICANCE TO MAN. (Eng.) Shubik, P. *In: Carcinogenesis Testing of Chemicals. Proceedings of a Conference on Carcinogenesis Testing in the Development of New Drugs held in Washington, DC, May 23-25, 1973.* Golberg, L., ed. (Cleveland: CRC Press, Inc.): pp. 45-50; 1974. (27 references)

5483 SOME EXAMPLES OF DOSE-RESPONSE STUDIES IN CHEMICAL CARCINOGENESIS. (Eng.) Port, R. (Deutsches Krebsforschungszentrum, Institut fuer Experimentelle Toxikologie und Chemotherapie, Postfach 101949, D-6900 Heidelberg 1, West Germany); Schmaehl, D.; Wahrendorf, J. *Oncology* 33(2): 66-71; 1976. (11 references)

5484 CUTANEOUS CHEMICAL CARCINOGENESIS: PAST, PRESENT, AND FUTURE. (Eng.) Yuspa, S. H. (In Vitro Pathogenesis Section, Experimental Pathology Branch, Div. Cancer Cause and Prevention, NIH, Bethesda, MD 20014); Hennings, H.; Saffiotti, U. *J Invest Dermatol* 67(1): 199-208; 1976. (93 references)

5485 THE ORIGIN AND INFLUENCE OF AIRBORNE PARTICULATES. (Eng.) Fennelly, P. F. (GCA/Technology Div., Burlington Road, Bedford, MA 01730). *Am Sci* 64(1): 46-56; 1976. (62 references)

5486 ASBESTOS DISEASE IN THE UNITED STATES: 1918-1975. (Eng.) Selikoff, I. J. (Mount Sinai Sch. Medicine, City Univ. New York, NY). *Rev Fr Mal Resp* 4: 7-24; 1976. (55 references)

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5488 OCCUPATIONAL BLADDER CANCER. (Eng.) Clayson, D. B. (Eppley Inst. for Res. in Cancer, Univ. Nebraska Medical Center, 42nd and Dewey Ave., Omaha, NB 68105). *Prev Med* 5(2): 228-244; 1976. (59 references)

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(Eng.) Wong, J. J. (Dept. Environmental Toxicology, Univ. California, Davis, CA 95616); Hsieh, D. P. *Proc Natl Acad Sci USA* 73(7); 2241-2244; 1976.

Aflatoxins and their animal biotransformation products were screened for carcinogenic potential with the Ames in vitro microbial detection system for carcinogens as bacterial mutagens. Aflatoxicol, aflatoxins G_1 and M_1, aflatoxicol H_1, and aflatoxins Q_1, B_2, P_1, G_2, B_2a, and G_2a, listed in order of decreasing mutagenic potency, were all less active than aflatoxin B_1. No compound possessed activity in the absence of the rat liver preparation, and this indicates that none of the animal metabolites are the ultimate mutagenic and/or carcinogenic species. The relative mutagenic potency observed with this in vitro system qualitatively correlates with the in vivo carcinogenic data. Comparison of both methods indicates: (a) aflatoxin B_1 possessed the structure optimal for both mutagenicity and carcinogenicity, (b) the decreased carcinogenicity of various animal metabolites is associated with their decreased mutagenicity, and (c) the 2,3-double bond is involved in both the mutagenic and carcinogenic activity of aflatoxins. The Ames assay is an extremely promising (toxicological) tool for the analysis of mycotoxins for mutagenic and/or carcinogenic activity. (41 references)

5546 REDUCTION OF NITROFURAN DERIVATIVES BY XANTHINE OXIDASE AND MICROSOMES: ISOLATION AND IDENTIFICATION OF REDUCTION PRODUCTS.

(Eng.) Tatsumi, K. (Faculty Pharmaceutical Sciences, Kyushu Univ., Fukuoka, Japan); Kitamura, S.; Yoshimura, H. *Arch Biochem Biophys* 175(1): 131-137; 1976.

The reduction products of nitrofurazone and 2-(furyl)-3-(5-nitro-2-furyl)acrylamide (AF-2) by milk xanthine oxidase, rat liver xanthine oxidase, and rat liver microsomes were studied. Mass spectrometry and other methods indicated that the ethyl acetate-extractable major product of each nitrofuran derivative should be the corresponding amine derivative or the equivalent compound. This was confirmed by an examination of the stoichiometry. The reduced nitrofurazone was finally identified as 5-amino-2-furfural semicarbazone by comparative studies with the authentic specimen. The reduced AF-2 was tentatively identified as 2-(2-furyl)-3-(5-oxo-2-pyrrolin-2-yl)acrylamide. (20 references)

5547 PEROXISOMES IN LIVER TUMORS OF RATS INDUCED BY 3'-METHYL-4-(DIMETHYLAMINO)AZOBENZENE.

(Eng.) Itabashi, M. (Dept. Pathology, Cancer Res. Inst., Sapporo Medical Coll., Minami-1-jo, Nishi-17-chome, Chuo-ku, Sapporo 060, Japan); Mochizuki, Y.; Tsukada, H. *Gann* 66(5): 463-472; 1975.

Morphological changes of peroxisomes in liver tumors of male Wistar rats fed freely on a pellet diet containing 0.06% 3'-methyl-4-(dimethylamino)azobenzene for 19-25 wk were studied along with the response of peroxisome formation to ethyl chlorophenoxyisobutyrate (CPIB). Peroxisomes in well-differentiated trabecular carcinoma (type I) resembled more or less those in hepatocytes in terms of their electron microscopic features, but they were considerably smaller in number. Poorly differentiated trabecular carcinoma (type II) and adenocarcinoma contained smaller numbers of peroxisomes than type I or, frequently, they showed no peroxisomes. Peroxisomes in type II trabecular carcinoma and adenocarcinoma wer small in size, contained a scanty matrix, and almos lacked crystalloid nucleoids; however, they were easily identified by the electron microscopic cytochemistry of catalase. The catalase activity of these tumors was significantly lower than in the liver tissues. Tumors in rats fed the carcinogen-containing diet for 17-23 wk followed by a diet containing both the carcinogen and 1% CPIB for an additional 2 wk did not respond to CPIB treatment either in terms of peroxisome proliferation or elev tion of catalase activity. Thus the cellular mechanisms for regulating peroxisomes and the synthesis of the enzyme involved are apparently impaired in the tumor cells. (31 references)

5548 MOUSE EPIDERMAL ARYL HYDROCARBON HYDROXYL

(Eng.) Thompson, S. (Fred Hutchinson Cancer Res. Center, 1102 Columbia St., Seattle, WA 98104); Slaga*, T. J. *J Invest Dermatol* 66(2): 108-111; 1976.

Mouse skin contains a NADPH-dependent, aryl hydrocarbon hydroxylase (AHH), which is inducible by polycyclic aromatic hydrocarbons. In general, unsub stituted polycyclic hydrocarbons caused a greater induction of epidermal AHH than substituted ones (1,2,3,4-dibenzanthracene > 1,2,5,6-dibenzanthracen > benz[a]anthracene ≥ 3-methylcholanthrene > 7,12-dimethylbenz[a]anthracene) which did not correlate with their ability to initiate tumors in mouse ski Two different techniques were used to isolate epide mis and similar results were obtained with both. However, the technique of isolating epidermis usin a mild heat treatment required that the temperatur be maintained at 52 C for 30 sec. If the temperatu was raised to 54 C or above, there was a large redu tion in the AHH activity. Isolated epidermis has 4 to 5 times the AHH activity as dermis and about twice that of whole skin. This was true for contro mice or mice in which AHH was induced by pretreatment with benz[a]anthracene.

5549 NATURALLY OCCURRING AND BRACKEN-FERN-INDUCED BOVINE URINARY BLADDER TUMORS: CLINICAL AND MORPHOLOGICAL CHARACTERISTICS.

(Eng.) Pamukcu, A. M. (Div. Clinical Oncology, Univ. Wisconsin Center for Health Sciences, 1300 Univ. Ave. Madison, WI 53706); Price, J. M.; Bryan, G. T. *Vet Pathol* 13(2): 110-122; 1976.

The clinical and morphological characteristics of 139 naturally occurring and 20 bracken-fern-induce urinary bladder tumors of cows were studied. Hemat ia was prominent and occurred as early as 60 days after bracken fern feeding began. Anemia and chang in WBC were late manifestations. Papillomas appear as early as 1 yr, whereas invasive carcinomas did not develop until 2.6 yr after initiation of feedi wenty of 30 cows fed bracken fern developed bladder umors within 5.3 yr. None of eight untreated conrol cows that lived 4 yr developed neoplasms, nor id any of the six controls that lived 10 yr. Natrally occurring and fern-induced bladder tumors ere epithelial (35%) or mixed epithelial and tromal (55%). Papillomas occurred in 24% and carinomas in 61% of naturally occurring cases, wheres papillomas occurred in 40% and carcinomas in 0% of the fern-fed cows. Naturally occurring umors were metastatic to the regional lymph odes and lung. No metastases were detected in ern-fed cows. (49 references)

550 ENHANCEMENT OF POSTREPLICATION REPAIR IN CHINESE HAMSTER CELLS. (Eng.) D'Ambrosio, . M. (Biology Dept., Brookhaven Natl. Lab., Upton, Y 11973); Setlow, R. B. *Proc Natl Acad Sci USA* 3(7): 2396-2400; 1976.

lkaline sedimentation profiles of pulse-labeled NA from Chinese hamster cells showed that DNA from ells treated with N-acetoxyacetylaminofluorene AAAF) or radiation was made in segments smaller han those from untreated cells. Cells treated with small dose (2.5 μM) of AAAF or 254-nm radiation, everal hours before a larger dose (7-10 μM) AAAF or 54-nm radiation, also synthesized small DNA after he second dose. However, the rate at which this mall DNA was joined together into parental size was ppreciably greater than in the absence of the small ose. This enhancement of postreplication repair (as result of the initial small dose) was not observed hen cells were incubated with cycloheximide between he two treatments. The results suggest that AAAFnd UV-damaged DNA from Chinese hamster cells are epaired by similar postreplicative mechanisms that equire de novo protein synthesis for enhancement. 36 references)

551 THIOACETAMIDE-POISONED RAT AS AN EXPERIMENTAL MODEL FOR THE ENDOCRINOLOGICAL STUDY F ESTROGEN METABOLISM IN CHRONIC HEPATIC INJURY. Ger.) Lopez del Pino, V. (Institut fuer Toxikologie er Universitaet Tuebingen, BRD-74 Tuebingen-1, Wilelmstrasse 56, West Germany); Bolt, H. M. *Endocrinlogie* 66(3): 250-254; 1975.

he changes in estrogen breakdown after thioacetamide hallenge are attributed to liver microsome injury nd diminished estrogen-2-hydroxylase formation. Six ats were pretreated with thioacetamide, and the nzymatic response of the liver microsomes was asayed against microsomal responses from three conrols. The cytochrome P-450 level was diminished by ore than half ($p < 0.001$), as was the process of niline p-hydroxylation ($0.005 > p > 0.001$). The romatic hydroxylation of estradiol was almost halved $0.02 > p > 0.01$). Aminopyrine N-demethylation and he concentration of the NADPH-cytochrome c reducase were not significantly affected. The breakdown f estradiol increased, since the level of estrone early doubled ($0.05 > p > 0.025$) and that of 16α-ydroxyestrone rose nearly 2.5 times ($p < 0.001$). striol levels were somewhat lower ($0.02 > p > 0.01$). ince NADPH-cytochrome c reductase concentration is unaffected, the rate-limiting step in the thioacetamide toxicity of mixed function oxidases is a marked decrease in levels of cytochrome P-450. Decreases in the 2-hydroxylation of estradiol, which is characteristic of liver cirrhosis in humans, and increases in the alternate pathway of 16α-hydroxylation follow from the low cytochrome level. (21 references)

5552 CONTROL OF CELL GROWTH. I. ESTROGEN-DEPENDENT GROWTH IN VIVO OF A RAT PITUITARY TUMOR CELL LINE. (Eng.) Sorrentino, J. M. (Dept. Biochemistry and Molecular Biology, Univ. Texas Medical Sch. Houston, P. O. Box 20708, Houston, TX 77025); Kirkland, W. L.; Sirbasku, D. A. *J Natl Cancer Inst* 56(6): 1149-1154; 1976.

A subclone of rat pituitary tumor cells, GH3/C14, isolated from GH3 pituitary cells, was estrogen-dependent for growth in vivo. GH3/C14 cells inoculated into 3- to 4-wk-old WF rats formed tumors in intact females, estrogen-treated ovariectomized females, and estrogen-treated males, but not in untreated intact or castrated males, or untreated ovariectomized females. Exogenous treatment with estrogens supported tumor formation in male animals. Radioimmunoassay of the average serum estradiol concentrations that support tumor growth in intact females, estradiol-treated intact females, and estradiol-treated intact males gave values of 41 ± 4, 1,130 ± 150, and 730 ± 140 pg/ml, respectively. Tumor formation by GH3/C14 cells inoculated into male animals was not supported by either exogenous progesterone or hydrocortisone acetate. These steroid hormones had no significant effect on the estrogen-promoted growth in males or females. Exogenous testosterone treatment promoted tumor formation in males and ovariectomized females, but dihydrotestosterone was ineffective. Radioimmunoassay of the serum from tumor-bearing animals and the medium from the cells in culture showed that the cells produced growth hormone in vivo and in vitro but did not produce measurable amounts of luteinizing hormone or follicle-stimulating hormone. The growth of GH3/C14 cells in culture was examined in medium without added estrogen, and with estradiol added to the level of either the normal intact female rat or the estradiol-treated rats. No direct growth stimulation by estrogens could be detected in culture; the data suggest an indirect growth control mechanism. (22 references)

5553 CONTROL OF CELL GROWTH. II. REQUIREMENT OF THYROID HORMONES FOR THE IN VIVO ESTROGEN-DEPENDENT GROWTH OF RAT PITUITARY TUMOR CELLS. (Eng.) Sorrentino, J. M. (Dept. Biochemistry and Molecular Biology, Univ. Texas Medical Sch. Houston, P. O. Box 20708, Houston, TX 77025); Kirkland, W. L.; Sirbasku, D. A. *J Natl Cancer Inst* 56(6): 1155-1158; 1976.

Examination of rat pituitary cell line GH3/C14 showed that at least the physiologic concentration of L-thyroxine (T4) was required for estrogen-dependent growth in vivo. Two T4 synthesis inhibitors, 6-n-propyl-2-thiouracil (propylthiouracil) and 1-methylimidazole-2-thiol (methimazole), were administered concurrently with estrogen to GH3/C14-inoculated hosts. Propylthiouracil administration to estrogen-treated males, intact females, and estrogen-treated ovariectomized females inhibited tumor formation by 93%, > 95%, and 68%, respectively, as compared to tumor formation in controls not treated with propylthiouracil. Methimazole treatment of estrogen-primed males and intact females inhibited tumor formation by 78% and 95%, respectively. Concentrations of total T4 and free T4 in sera from normal and inhibitor-treated hosts were depressed 70%-80% by propylthiouracil and 60%-70% by methimazole. Administration of either drug caused greater inhibition of tumor growth than of total body weight gain. In addition, the administration of a combination of T4 and L-triiodothyronine to male rats promoted tumor formation even in the absence of exogenous estrogen. (20 references)

5554 CONTROL OF CELL GROWTH. III. DIRECT MITOGENIC EFFECT OF THYROID HORMONES ON AN ESTROGEN-DEPENDENT RAT PITUITARY TUMOR CELL LINE.

(Eng.) Kirkland, W. L. (Dept. Biochemistry and Molecular Biology, Univ. Texas Medical Sch. at Houston, P. O. Box 20708, Houston, TX 77025); Sorrentino, J. M.; Sirbasku, D. A. *J Natl Cancer Inst* 56(6): 1159-1164; 1976.

A possible direct estrogen requirement for growth of GH3/C14 rat pituitary tumor cells was evaluated in culture medium supplemented with estrogen-depleted serum prepared by a 56 C charcoal extraction procedure, and with serum obtained from ovariectomized and ovariectomized-adrenalectomized sheep. Growth of the cells in culture medium in which the final estrogen concentration was 2 pg/ml or less was equal to growth in medium with normal serum and to growth in the presence of estrogen-depleted serum to which estradiol was added back at concentrations of 10-1,000 pg/ml. Under no conditions could a direct estrogen requirement for growth be demonstrated. The function of thyroid hormones in cell growth was examined in culture medium supplemented with serum from thyroidectomized sheep. In such medium cell growth was stimulated 3.5-fold by addition of 1.0 x 10^{-8} M L-thyroxine (T4) or 1.0 x 10^{-9} M L-triiodothyronine (T3). Combinations of estrogen and T4 or T3 did not stimulate growth over that seen with T4 or T3 alone. These data indicate that estrogens are not direct growth requirements for these cells but instead operate in vivo through secondary or indirect mechanisms; in contrast, thyroid hormones are directly mitogenic in vitro. (6 references)

5555 HEPATOCELLULAR CARCINOMA AND ORAL CONTRACEPTIVES (Letter to Editor).

(Eng.) Mays, E. T. (Univ. Kentucky, Albert B. Chandler Medical Center, Lexington, KY). *JAMA* 236(6): 500; 1976.

Data are presented in response to the question of the relationship between oral contraceptives and hepatocellular carcinoma. Ten patients with hepatocellular malignancies, all of whom were taking oral contraceptives, were studied. It is thought that the C-17 alkylated steroid ring, common to most of the hormone drugs, may be responsible for the carcinomas. It is concluded that to focus on one kind of tumor and one kind of drug is inappropriate. A medley of changes induced by reproductive steroids are described, including Budd-Chiari syndrome and endothelial proliferations. (7 references)

5556 THE EFFECTS OF DIETHYLSTILBESTROL (DES) ON THE CELL CYCLE OF DES-INDUCED RENAL CARCINOMA OF SYRIAN HAMSTER IN VITRO.

(Eng.) Masuda, M. (Yamaguchi Univ. Sch. Medicine, Ube, Japan). *Bull. Yamaguchi Med. Sch.* 22(2): 227-238; 1975.

The effects of diethylstilbestrol (DES) on the cell cycle of a culture of DES-induced renal carcinoma in a male Syrian hamster were studied with the use of a computer program developed for analysis of the fraction of labeled mitoses in a transient state. The addition of DES (7.58 or 11.37 mg/dl) decreased the generation time T_C to approximately 50% of the control; this occurred mainly in the G1 phase. T_S was also decreased considerably, but T_{G2} was slightly increased with the higher concentrations of DES. DES is probably both stimulative and toxic. Large doses produce toxicity that overwhelms the cycle-stimulating effect.

5557 BENIGN HEPATIC TUMORS AND THEIR ASSOCIATION WITH ORAL CONTRACEPTIVES: CASE REPORT AND SURVEY OF THE LITERATURE.

(Eng.) McAvoy, J. M. (Dept. Surgery, UCLA Sch. Medicine, Los Angeles, CA 90024); Tompkins, R. K.; Longmire, W. P., Jr. *Arch Surg* 111(7): 761-767; 1976.

Thirty-three literature cases of benign hepatic tumors in young women who had been receiving oral contraceptive steroids are reviewed in detail. Two additional cases, one of focal nodular hyperplasia and the other of multiple hepatic cell adenomas, ar included to emphasize the pathological differentiation between these two lesions. Twelve of the 35 patients had massive intraperitoneal bleeding; two other patients had less severe hemoperitoneum. Five deaths have been reported. However, a direct relationship between oral contraceptives and benign hepatic tumors has not been proved. (24 references)

5558 RELATIONSHIP BETWEEN RESERPINE TREATMENT AND ELEVATED RISK OF BREAST CANCER.

(Ger.) Berndt, H. (Zentralinstitut fuer Krebsforschung, Akademie der Wissenschaften der DDR, 1115 Berlin-Buch, Lindenberger Weg 80, East Germany); Gibel, W. *Dtsch Gesundheitswes* (17): 777-779; 1976.

Three retrospective studies (from the US, Britain, and Finland) made in 1974 and linking increases in breast cancer in menopausal women with the use of reserpine or other Rauwolfia preparations are evaluated. In none of the studies was the blood pressure of the probands compared with the controls, nor were any data given on the total dose or duration of exposure. Moreover, there was a lack of attention to the predominance of endomorphic body types, since both hypertension and obesity are char teristic of the postmenopausal age most vulnerable to breast cancer. That younger women under reserpin management do not present a statistically higher reast cancer morbidity is considered decisive. everal other critical studies and animal experiments re reviewed. Reserpine liberation of prolactin is onstrued as an illegitimate explanation, since ethyldopa [L-3-(3,4-dihydroxyphenyl)-2-methyl- lanine] also liberates prolactin without evidence f tumor formation and since prolactin might not be nvolved in the proliferation of human mammary tis- ue. It is recommended that menopausal women with oderate to severe hypertension (diastolic 105 mm Hg r higher) continue on reserpine if the pressure is atisfactorily controlled by the drug. (17 references)

559 EFFECT OF PROLACTIN ON THE METABOLISM OF ANDROGENS BY THE RAT VENTRAL PROSTATE LAND IN VITRO. (Eng.) Manandhar, M. S. (Dept. Phar- acology, West Virginia Univ. Medical Center, Morgan- own, WV 26506); Thomas, J. A. *Invest Urol* 14(1):)-22; 1976.

ien homogenates of Wistar rat ventral prostate lands were incubated with varying amounts of prolac- in (0.2, 0.8, or 2.0 international units (IU)/ml), iere were significant alterations in the bioconver- ion of [^{3}H]testosterone and its principal radio- etabolites. A 2.0-IU/ml dose of prolactin signifi- antly reduced the metabolism of labeled testosterone n the prostate gland. Similarly, the amounts of ^{3}H]5α-androstane-3β,-17β-diol formed from [^{3}H]tes- osterone were significantly lower in the prolactin- reated groups than they were in the controls. Only ne highest dose of prolactin (2.0 IU/ml) impaired ne conversion of [^{3}H]testosterone to [^{3}H]17β-hydroxy- α-androstan-3-one and to [^{3}H]-dihydrotestosterone n the homogenates of rat ventral prostate glands. nese findings suggest that prolactin is capable of xerting intracellular actions, as evidenced by its bility to interfere with steroidogenesis in andro- en-dependent tissues.

560 CULTURES OF NORMAL HUMAN MAMMARY CELLS. (Eng.) Gaffney, E. V. (Dept. Biology, ennsylvania State Univ., University Park, PA 16802); olanowski, F. P.; Blackburn, S. E.; Lambiase, J. .; Burke, R. E. *Cell Differ* 5(2): 69-81; 1976.

pithelial cells were obtained from large quantities f normal human breast tissue, and the response of hese cells in culture to lactogenic hormones was tudied. Suspensions of single cells and clusters of ells resembling normal ductal and alveolar struc- ures were obtained by mechanical disaggregation and ubsequent (3-hr) incubation of tissue fragments in .5 mg/ml collagenase. Cells rapidly attached to lass or plastic surfaces within 48 hr and grew to orm large colonies that maintained their epithelial ppearance throughout 2 mo of observation. Cell ycling (monitored by DNA synthesis) was enhanced by nsulin, hydrocortisone, or bovine prolactin (in oncentrations of 5.0 μg/ml each) at 2, 3, and 5 ays of incubation, respectively. These results were bserved in cultures derived from three premenopause amples of mammary tissue maintained in medium with % fetal calf serum. Prolactin at 5 μg/ml induced hosphoprotein synthesis eightfold over control alues. In addition, prolactin induced morphological changes in cells, including the development of distended endoplasmic reticulum and large microvilli and the deposition of glycogen granules. It is concluded that prolactin is sufficient to initiate some of the characteristics in cultured cells normally associated with lactating tissues. (19 references)

5561 EFFECT OF PROCAINE ON DEVELOPMENT OF 'RIDGES' AND 'DOMES' IN PRIMARY CELL CULTURES FROM MAMMARY GLANDS OF UNTREATED VIRGIN MICE. THE ROLE OF CELL DENSITY IN THE OCCURRENCE OF 'DOMES'. (Eng.) Wiepjes, G. J. (Pathologish Anatomisch Laboratorium, Academisch Ziekenhuis ''Wilhelmina Gasthuis'', Amsterdam, The Netherlands); Visser, A. S.; Prop, F. J. A. *Exp Cell Res* 98(1): 136-142; 1976.

Primary cell cultures from the mammary glands of virgin mice that were not pretreated with hormones were subjected to: (a) procaine; (b) insulin + prolactin + hydrocortisone; (c) a combination of (a) and (b). Procaine caused a ridge effect similar to that of the hormones. The combination of procaine with the hormones caused a still stronger ridge effect as well as the formation of domes. Hormone-treated controls also grew ridges and domes. The ridge growth was reversible upon the withdrawal of the hormones. The ridges of the procaine-treated cultures were not reversible when procaine was withdrawn.

5562 EFFECT OF METABOLITES OF 7,12-DIMETHYLBENZ(a)ANTHRACENE ON THE DYNAMICS OF ITS FLUORESCENCE IN THE SKIN OF HAIRLESS MICE. (Eng.) Lopp, A. K. (Dept. for Study of Carcinogenic Agents, Inst. Experimental and Clinical Oncology, Acad. Medical Sciences USSR, Moscow, USSR); Belitskii, G. A. *Bull Exp Biol Med* 80(12): 1487-1490; 1975.

The effect of two metabolites of 7,12-dimethylbenz(a)anthracene (DMBA)--7-hydroxymethyl-12-methylbenz(a)anthracene (7-OHM-12-MBA) and 7,12-dihydroxymethylbenz(a)anthracene (7,12-di-OHMBA)--on the dynamics of its fluorescence in mouse skin was investigated. About 5 μg DMBA in benzene or a solution of DMBA mixed with one of its metabolites in molar proportions of 1:0.5 or 1:1 was applied to the skin of hairless female mice aged 3-4 mo. Measurements were made for 2 hr after application, at 30-min intervals and at 430 nm, with an apparatus consisting of a luminescent microscope, a photoelectric multiplier, and a recorder. 7-OHM-12-MBA possessed weaker fluorescence than DMBA, but the dynamics of its elimination from the skin coincided with the DMBA elimination curve. The fluorescence of 7,12-di-OHMBA was even weaker, but it remained at the same level for 2 hr after application, indicating that it is eliminated more slowly. When DMBA was applied with 7-OHM-12-MBA in the ratio of 1:1 or 1:0.5 or with 7,12-di-OHMBA (1:0.5), the decrease of recordable fluorescence was unchanged and the elimination curve was indistinguishable from that of DMBA alone. When DMBA and its derivatives were applied to the skin in the ratio of 1:1, their combined fluorescence was less than additive, whereas if they were applied in the ratio of 1:0.5, it was greater than additive. When DMBA and 7,12-di-OHMBA were applied in equimolar proportions, the fluorescence remained constant in intensity from 30 min to 2 hr after application of the hydrocarbons. This curve resembled the fluorescence pattern of DMBA in the presence of 7,8-benzoflavone (7,8-BF), one of the most powerful inhibitors of the enzyme system that metabolizes DMBA and other hydrocarbons. Further experiments in tissue culture and with isolated microsomes are necessary to confirm that 7,12-di-OHMBA can inhibit the oxidation of DMBA in the same way as 7,8-BF. (19 references)

5563 THE BINDING OF BENZ(A)ANTHRACENE DERIVATIVES TO GLYCERALDEHYDE-3-PHOSPHATE DEHYDROGENASE AND MAMMARY TISSUE FOLLOWING EXPOSURE TO LABORATORY LIGHT. (Eng.) Grubbs, C. J. (Dept. Biochemistry, Univ. Tennessee Center Health Sciences, 800 Madison Ave., Memphis, TN 38163); Wood*, J. L. *Chem Biol Interact* 12(2): 135-144; 1976.

7,12-Dimethylbenz(a)anthracene (DMBA) and 7-methoxymethyl-12-methylbenz(a)anthracene (MeO-DMBA) were converted to a number of products during short exposures in aqueous suspension to illumination. The mixture of products bound to glyceraldehyde-3-phosphate dehydrogenase (GPDH) while inhibiting its activity but there was no apparent relationship between the binding and inhibition of enzyme activity. There was little, or no binding or enzyme inhibition when the compounds were protected from light. 7-Bromomethyl-12-methylbenz(a)anthracene bound to GPDH whether photoactivated or not but enzyme inhibition depends upon light exposure. The binding of light-exposed DMBA by surviving rat mammary tissue was five times greater than with the unchanged hydrocarbon. Binding of MeO-DMBA products also occurred after light exposure but not in the dark.

5564 REACTIONS OF THE K-REGION OXIDES OF CARCINOGENIC AND RELATED POLYCYCLIC HYDROCARBONS WITH NUCLEOPHILES: STEREOCHEMISTRY AND REGIOSELECTIVITY. (Eng.) Beland, F. A. (Ben May Lab., Univ. Chicago, Chicago, IL 60637); Harvey, R. G. *J Am Chem Soc* 98(16): 4963-4970; 1976.

The reactions of a series of K-region oxides, including derivatives of carcinogenic hydrocarbons, with the model nucleophile tertbutyl mercaptide anion were studied. These reactions afforded the products of trans-stereospecific addition to the oxide ring in aqueous dioxane or addition-dehydration to tert-butylthioarenes in tetrahydrofuran. Product structures accorded with region-selective attack at the most electrophilic center(s), in agreement with molecular orbital theoretical prediction. Addition to the K-region oxide of the potent carcinogen 7,12-dimethylbenz[a]anthracene took place selectively at the 6 position with rearrangement during dehydration to furnish 7,12-dimethyl-5-tert-butylthiobenz[a]anthracene. Structural assignments were aided by 270-MHz high-resolution NMR spectroscopy utilizing benzylic coupling constants, lanthanide-induced shifts, and nuclear Overhauser enhancement measurements in the 1:1 adducts and an observed strong downfield shift of the aryl protons adjacent to thio ether group in the alkythioarenes. (40 references)

5565 A COMPARISON OF STEROID GLUCURONYLTRANSFERASES OF RAT LIVER AND HEPATOMA, AND EFFECTS OF PHENOBARBITONE AND 3-METHYLCHOLANTHRENE INDUCTION. (Eng.) Gessner, T. (Grace Cancer Drug Center, Roswell Park Memorial Inst., Buffalo, NY 14263). *Biochem Soc Trans* 4(3): 522-524; 1976.

Hepatoma glucuronyltransferase activity was studied with the use of steroid substrates. Phenobarbitone and 3-methylcholanthrene (known inducers of microsomal enzymes) were tested for their effectiveness in inducing glucuronyltransferase activity in the liver and in hepatomas. Male ACI rats, normal or bearing an im Reuber H-35 hepatoma, were used in the studies. The results suggest that there may be a multiplicity of glucuronyltransferases in hepatomas, as well as in the liver, and that steroid glucuronyltransferases of the liver can be induced by hepatic microsomal inducers; however, the same agents may be ineffective in increasing the glucuronyltransferase activities of a hepatoma. (7 references)

5566 STUDIES ON THE EFFECT OF ONCORNAVIRAL VACCINES ON THE PROGRESSION OF CHEMICAL CARCINOGENESIS. (Eng.) Gericke, D. (Cancer Res. Lab., Hoechst AG, Frankfurt, West Germany); Chandra, P. *Cancer Lett (Amsterdam)* 1(6): 305-310; 1976.

The effect of inactivated oncornaviral vaccines (Friend leukemia virus and Rous sarcoma virus) on the progression of carcinogenesis (9-63 wk) induced by 3-methylcholanthrene (MC, 0.1 mg) and benzo(a)-pyrene (BP, 0.2 mg) was studied. Viral preparations, purified by density-gradient centrifugation, were inactivated by incubation with 0.1% formalin or 90% dimethylsulfoxide (DMSO). The carcinogens were administered sc 4 wk after the ip injection of vaccines; control animals received only the inactivated agents. The progression of MC-induced carcinogenesis was significantly inhibited by the formalin-inactivated viral vaccines; the protective action was more pronounced in the early phase of tumorigenesis. However, pretreatment with the DMSO-inactivated vaccines led to a potentiation of MC-induced carcinogenesis. Regardless of the mode of inactivation, none of the viral vaccines showed any protective effect on BP-induced carcinogenesis. On the contrary, a very significant potentiation of BP-induced carcinogenesis was observed in animals pretreated with formalin-inactivated vaccines. (9 references)

5567 METABOLISM OF [^{3}H]BENZO(a)PYRENE BY DIFFERENT PORTIONS OF THE RESPIRATORY TRACT. (Eng.) Cohen, G. M. (Dept. Biochemistry, Univ. Surrey, Guildford, GU2 5XH, England); Moore, B. P. *Biochem Pharmacol* 25(14): 1623-1629; 1976.

The metabolism of benzo(a)pyrene by isolated perfused lungs and tracheal, bronchial, and lung cultures was studied in male Wistar albino rats and male Syrian golden hamsters. The ethyl acetate-solubl metabolites were qualitatively similar in the tracheal and bronchial cultures, whereas in the lung cultures large amounts of a new metabolite of 3-hydroxybenzo(a)pyrene (3-HBP) were formed. An uniden-

fied metabolite migrating between 4,5-dihydro-4,5-
hydroxybenzo(a)pyrene and 3-HBP was observed in
t and hamster lung cultures and isolated rat lung
rfusions. Dihydrodiols, in particular 9,10-dihydro-
10-dihydroxybenzo(a)pyrene are the major metab-
ites formed in the tracheal and bronchial cultures.
contrast, 3-HBP and its metabolite are the major
tabolites formed by the isolated perfused lungs
d lung cultures, respectively. Much higher concen-
ations of water-soluble metabolites were produced
the lung cultures than in the tracheal and bron-
ial cultures. The formation, accumulation, and
lative resistance to metabolism to water-soluble
tabolites of dihydrodiols in the trachea and bron-
i may partially explain the higher susceptibility
these areas to hydrocarbon carcinogenesis. (21
ferences)

58 COCARCINOGENIC AND TUMOR-PROMOTING AGENTS
IN TOBACCO CARCINOGENESIS. (Eng.) Van
ren, B. L. (Lab. Organic Chemistry and Carcino-
esis, Inst. Environmental Medicine, New York
v. Medical Center, New York, NY 10016); Gold-
midt, B. M. *J Natl Cancer Inst* 56(6): 1237-1242;
76.

eries of 21 tobacco smoke components and related
pounds was tested for cocarcinogenic activity on
se skin. The compounds were applied to mouse skin
female ICR/Ha Swiss mice/group) three times wk
h a low dose (5 μg/application) of benzo[a]pyrene
a]P). The test compounds were of five classes:
phatic hydrocarbons, aromatic hydrocarbons,
nols, and long-chain acids and alcohol. The fol-
ing compounds enhanced remarkably the carcinogen-
ty of B[a]P: catechol, pyrogallol, decane, un-
ane, pyrene, benzo[e]pyrene, and fluoranthene.
following compounds inhibited B[a]P carcinogen-
ty completely: esculin, quercetin, squalene, and
ic acid. Phenol, eugenol, resorcinol, hydroquinone,
adecane, and limonene partially inhibited B[a]P
cinogenicity. Six of the 21 compounds were also
ted as tumor promoters in two-stage carcinogenesis.
direct correlation existed between tumor-promoting
ivity and cocarcinogenic activity. The cocarcino-
s pyrogallol and catechol did not show tumor-
moting activity. Decane, tetradecane, anthralin,
phorbol myristate acetate showed both types of
ivity. Structure-activity relationships and pos-
le modes of action are described. (31 references)

9 THE ROLE OF EPIDERMAL ARYL HYDROCARBON
HYDROXYLASE IN THE COVALENT BINDING OF
YCYCLIC HYDROCARBON TO DNA AND ITS RELATIONSHIP
TUMOR INITIATION. (Eng.) Buty, S. G. (Fred Hutchin-
Cancer Res. Center, 1102 Columbia St., Seattle,
98104); Thompson, S.; Slaga, T. J. *Biochem Biophys
Commun* 70(4): 1102-1108; 1976.

se epidermis contains an NADPH-dependent aryl
rocarbon hydroxylase inducible by polycyclic
matic hydrocarbons. The covalent binding of radio-
ive 3-methylcholanthrene (3-MC) to DNA by epider-
aryl hydrocarbon hydroxylase in vitro (as a
ction of time after induction with unlabeled 3-MC
vivo) indicated that the specific activity of binding reached a peak by 12 hr. A correlation appears to exist between the tumor initiating ability of several hydrocarbons and their ability to covalently bind to DNA in vitro with mouse epidermal homogenates and NADPH as an electrophile generating system (7,12-dimethylbenz(a)anthracene > 3-MC > benzo(a)pyrene > 1,2,5,6-dibenzanthracene > 1,2,3,4-dibenzanthracene). (No references)

5570 VARIATION IN ARYL HYDROCARBON (BENZO[A]-PYRENE) HYDROXYLASE ACTIVITY IN HETEROPLOID AND PREDOMINANTLY DIPLOID RAT LIVER CELLS IN CULTURE. (Eng.) Whitlock, J. P. (Natl. Inst. Arthritis, Metabolism, Digestive Diseases, Bethesda, MD 20014); Gelboin, H. V.; Coon, H. G. *J Cell Biol* 70: 217-225; 1976.

The aryl hydrocarbon (benzo[a]pyrene) hydroxylase activity was examined in Buffalo rat liver cells (BRL-3C4) in culture. Cells from a 6-wk-old female rat were grown in Ham's mixture F-12(15) in a 5% CO_2 humidified atmosphere in an incubator. The subcloned populations were assayed for hydroxylase activity 25 to 30 cell generations after the original clonal plating. There is substantial variation in both basal and inducible hydroxylase activities among heteroploid subclones isolated from a heteroploid parent population and among diploid subclones isolated from a diploid parent population. This variation is not related to differences in the growth characteristics of the subclones or to differences in their chromosome number. The results indicate that substantial heterogeneity in both basal and induced hydroxylase activity develops during the growth of both heteroploid and diploid cell strains in culture. These findings indicate that diploid cell populations are not necessarily homogeneous with respect to aryl hydrocarbon hydroxylase activity. This observation may complicate the interpretation of experiments involving somatic cell hybridization or polycyclic hydrocarbon-induced transformation and/or cytotoxicity. This heterogeneity in hydroxylase activity develops rather rapidly (2-3 mo of culture), in the absence of any apparent mutational stress. (28 references)

5571 GENETIC ASSOCIATION OF INCREASES IN NAPHTHALENE, ACETANILIDE, AND BIPHENYL HYDROXYLATIONS WITH INDUCIBLE ARYL HYDROCARBON HYDROXYLASE IN MICE. (Eng.) Atlas, S. A. (Developmental Pharmacology Branch, Natl. Inst. Child Health and Human Development, NIH, Bethesda, MD 20014); Nebert, D. W. *Arch Biochem Biophys* 175(2): 495-506; 1976.

Four hepatic monooxygenase activities, naphthalene trans-1,2-dihydrodiol formation, acetanilide 4-hydroxylase, biphenyl 4-hydroxylase, and biphenyl 2-hydroxylase, were studied with respect to: (a) preferential inhibition by metyrapone, α-naphthoflavone, or Tween 80 in vitro; (b) use of the microsomal inducers 3-methylcholanthrene, β-naphthoflavone, 2,3,7,8-tetrachlorodibenzo-p-dioxin, or phenobarbital; (c) apparent Km values; and (d) heat inactivation. Aromatic hydrocarbon-induced naphthalene monooxygenase, acetanilide 4-hydroxylase, biphenyl 4-hydroxylase, and biphenyl 2-hydroxylase activities were, like the induced aryl hydrocarbon hydroxylase activity, associated with cytochrome(s) P_1-450, and the basal activities of the first three of these enzymes were, like basal aryl hydrocarbon hydroxylase activity, associated with one (or more) forms of cytochrome P-450 other than cytochrome(s) P_1-450. In contrast, the basal biphenyl 2-hydroxylase activity in mouse liver was associated solely with cytochrome(s) P_1-450; this finding differs from all other basal monooxygenase activities associated with the *Ah* locus and studied thus far in a similar manner. (46 references)

5572 EFFECTS OF ALTERATION OF HEPATIC MICROSOMAL ENZYME ACTIVITY ON LIVER BLOOD FLOW IN THE RAT.

(Eng.) Nies, A. S. (Depts. Medicine and Pharmacology, Vanderbilt Univ. Sch. Medicine, Nashville, TN 37232); Wilkinson, G. R.; Rush, B. D.; Strother, J. T.; McDevitt, D. G. *Biochem Pharmacol* 25(17): 1991-1993; 1976.

The effects of pretreatment with 10 daily ip injections of phenobarbital (8 mg/100 g/day), 3,4-benzpyrene (1 mg/100 g/day), and 3-methylcholanthrene (1 mg/100 g/day) and a single injection of SKF-525A (30 mg/kg) on liver blood flow in Sprague-Dawley rats were studied with radioactive microspheres. Of the hepatic enzyme-inducing agents, only phenobarbital increased the total liver blood flow, which averaged 33%, and increased liver mass. The polycyclic hydrocarbons caused a small increase in liver mass of 11%-15% and no change in liver blood flow. All three agents induced drug-metabolizing enzymes, as judged by zoxazolamine paralysis time. SKF-525A produced no change in liver blood flow or liver mass. Liver blood flow per gram of liver was unchanged in all groups. The increase in liver blood flow caused by phenobarbital was due entirely to an increase in flow to the splanchnic organs draining into the portal vein. These results imply that total hepatic blood flow is influenced by liver mass and that the responsible, but as yet unknown, mechanism(s) involves the portal circulation. (14 references)

5573 AGE-DEPENDENCE OF HEPATIC DIMETHYLNITROSAMINE-DEMETHYLASE ACTIVITY IN THE RAT.

(Eng.) Davies, D. L. (US Public Health Service Hosp., 210 State St., New Orleans, LA 70118); Bryant, G. M.; Arcos, J. C.; Argus, M. F. *J Natl Cancer Inst* 56(5): 1057-1058; 1976.

The mixed-function oxidase that activates the carcinogen dimethylnitrosamine (DMN), administered ip in corn oil at 40 mg/kg body wt, was determined in the liver of male Sprague-Dawley rats as a function of animal age. DMN-demethylase activity increased considerably at first to reach a maximum on day 29, and then substantially decreased to day 59; thereafter, enzyme activity remained essentially stable up to at least day 110. Pretreatment with 3-methylcholanthrene in the same dosage as DMN caused a pronounced decrease in this enzyme activity but did not affect the general shape of the age-dependence curve. Since DMN-demethylase is the sole activating enzyme in the alkylation of cell macromolecules by DMN, the surge of enzyme activity at about 1 mo of age suggests that rats between weaning and sexual maturity are more susceptible to the carcinogenicity of pulse doses of DMN than neonates or adult animals. (14 references)

5574 FORMATION OF DIMETHYLNITROSAMINE FROM PESTICIDES CARRYING METHYLATED TERTIARY AMINOGROUPS IN THE PRESENCE OF NITRITE AT PH 3.

(Eng.) Egert, G. (Abteilung fuer Toxicologie, Unive sitaet Tubingen, D-74 Tubingen, West Germany); Grei H. *Food Cosmet Toxicol* 14(3): 193-195; 1976.

Pesticides and nitrites in food may be a hazard to man, since many pesticides are secondary or tertiar amines, which form nitroso compounds in the presenc of nitrite under conditions resembling those in the human stomach. Four tertiary amine pesticides--two dimethylurea derivatives, one thiuram disulfide, an one phosphine compound--were incubated for 4 hr at 37 C in the presence of excess nitrite at pH 3. The reaction products were extracted with dichlorometha and analyzed qualitatively and quantitatively by IR spectrophotometry, nuclear-magnetic-resonance spectrometry, gas chromatography-mass spectrometry, and light spectrophotometry. All four pesticides formed the carcinogen dimethylnitrosamine, the yields obta ed being cycluron 4%, chloroxuron 3%, thiram 9%, an dimefox 22%. Excess nitrite must be present for maximal DMN formation. (18 references)

5575 MUTAGENIC SELECTIVITY OF CARCINOGENIC NITROSO COMPOUNDS: III. N,α-ACETOXYMETHYL N-METHYLNITROSAMINE.

(Eng.) Fahmy, O. G. (Inst. Cancer Res., Chester Beatty Res. Inst., Royal Cance Hosp., Fulham Road, London SW3 6JB, Great Britain); Fahmy, M. J. *Chem-Biol Interact* 14(1/2): 21-35; 1976.

A comparative genetic study was made of the testicular tissue of *Drosophila melanogaster* with N,α-acetoxymethyl-N-methylnitrosamine and its unsubstituted parent N,N-dimethylnitrosamine to assess the role of intracellular metabolism on thei mutagenicities. The relative genetic potencies of the two compounds were deduced from regression studies of the dose effect on the metabolically inert sperm and the metabolizing early germ cells (spermatocytes and spermatogonia) with respect to the induction of the nonspecific X-chromosome reces sives (lethals and visibles) and the specific effec on representatives of the RNA genes, especially ribosomal DNA (rDNA). Dosages ranged from 0.1-5.0 mM. Genetic activity per unit molar dose was invari ably higher for the acetoxy derivative, but the differential in this respect varied significantly for various mutational classes and as a function o the metabolic level in the target cells. The induction of point-mutations (X-recessives) increased with the level of intracellular metabolism with bot compounds; this was more pronounced with the parent amine, which was in accordance with the DNA methyla tion mechanism. In contrast, the yield of the spec rDNA deletions was not markedly enhanced with the acetoxy derivative. The induction of these deletio could not, therefore, be explained on the basis of DNA methylation, but was reconcilable with the possible generation of a nitrosoaldehydic metabolite, which could effect DNA-protein cross-linkage within the genic nucleoproteins. The two test compounds gave comparable frequencies of mosaicism among corresponding mutations and the same rDNA selectivity index, which indicated identical molecular mechanisms of mutagenesis. The higher genetic potency of the acetoxy derivative would thus indicate its greater yield of the same mutagenic metabolites. Carcinogenicity studies with the two compounds paralleled the mutagenicity results, which would suggest that the same molecular mechanisms could be responsible for the initiation of both phenomena. (20 references)

576 THE INTERACTION OF ACETOXY-DIMETHYLNITROSAMINE, A PROXIMATE METABOLITE OF THE CAR- INOGENIC AMINE, AND BACTERIOPHAGES R17 AND T7.

Eng.) Shooter, K. V. (Inst. Cancer Res., Chester eatty Res. Inst., Royal Cancer Hosp., Fulham Road, ondon, SW3 6JB, Great Britain); Wiessler, M. *Chem iol Interact* 14(1/2): 1-11; 1976.

he biological and physicochemical effects of react- ng bacteriophages R17 and T7 with acetoxydimethyl- itrosamine (ADMN) were studied. Bacteriophage was uspended in a buffer solution and weighed amounts f ADMN dissolved in dimethylformamide were added 20 mg/ml). The rate-determining step in the reac- ions appeared to be the loss of the acetoxy group y hydrolysis, the hydroxymethylmethylnitrosamine enerated decomposing rapidly to give a methyldi- zonium ion and formaldehyde. In experiments with acteriophage suspended in phosphate buffer the iological inactivation observed was the sum of the ffects of the formaldehyde and of alkylation by the ethylcarbonium ion produced from the diazonium ion. n experiments with bacteriophage suspended in Tris- Cl buffer the effects of formaldehyde were eliminated y its reaction with the buffer component. Alkyla- ion by the carbonium ion produced unstable phospho- riesters in the bacteriophage RNA, which on hydrolsis led to degradation of the molecule. In phosphate uffer the formaldehyde cross-linked the protein oat of the bacteriophage blocking the extraction of he RNA. Estimates of the mean lethal dose and of he extent of degradation of the RNA following reac- ion in Tris-HCl buffer were fairly close to those bserved in experiments with N-methyl-N-nitrosourea. 31 references)

577 TOXICOLOGICAL EFFECTS OF DIETHYLNITROSAMINE (DENA) IN GUPPIES (*LEBISTES RETICULATUS*).

Ger.) Scherf, H. R. (Deutsches Krebsforschungszen- rum, D-6900 Heidelberg, Im Neuenheimer Feld 280, est Germany). *Z Krebsforsch* 86(2): 155-163; 1976.

iethylnitrosamine was administered to male and emale guppies at levels of 26 mg or 100 mg per iter of aquarium water. The final concentration fter vapor pressure adjustment was 85 mg and 22.5 g per liter, at 20-22 C. Experimentation was per- ormed in the dark to subvert human contamination. l the fish died within 3 mo at the higher concen- ation and within 7 mo at the lower one; nearly half of the controls also succumbed in 7 mo. No frank evidence of tumors was found macroscopically or histologically. Since nitrosamines are light-sensitive and only the already activated form is carcinogenic in fish, the dark experimental ambience precluded carcinogenicity. Histologically, the hepatic parenchymal cells exhibited increasing atypia, with small, dense nuclei; at high doses these areas were increasingly well separated by connective tissue. Lower doses had the same effect but required longer exposures. The pancreas and spleen showed similar parenchymal changes. (12 references)

5578 COMBINATION EFFECT OF CITRININ AND OTHER CHEMICALS ON RAT KIDNEY TUMORIGENESIS.

(Eng.) Shinohara, Y. (Nagoya City Univ. Medical Sch., 1 Kawasumi, Mizuho-cho, Mizuho-ku, Nagoya 467, Japan); Arai, M.; Hirao, K.; Sugihara, S.; Nakanishi, K.; Tsunoda, H.; Ito, N. *Gann* 67(2): 147-155; 1976.

Histological studies were made on the nephrotoxic effect of citrinin on the kidneys of male Sprague-Dawley rats, with or without previous treatment with the nephrotoxic chemicals N-(3,5-dichlorophenyl)-succinimide (NDPS) and N-nitrosodimethylamine (DMN). Oral administration of 0.02% or 0.05% cirtinin alone caused signs of kidney injury but did not induce tumors. On treatment with DMN alone, 8 of 14 rats (57.1%) developed kidney tumors; two (14.3%) were renal cell tumors, eight (51.1%) embryonal cell tumors, and one (7.1%) was a hemangioendothelioma. Kidney tumors developed in 18 to 19 rats (94.7%) and 13 of 15 rats (86.7%) by the administration of 0.02% and 0.05% citrinin, respectively, after DMN. In these rats the incidence of renal cell tumors was much greater and the incidence of embryonal cell tumors slightly greater than in the group treated with DMN alone, indicating that citrinin changes the histological type and incidence of kidney tumors induced in rats by DMN. Hemangioendothelioma did not develop. Kidney tumors developed in 4 of 18 rats (22.2%) treated with 0.02%) citrinin after NDPS, but treatment with NDPS alone did not induce kidney tumors. (28 references)

5579 KINETICS OF INDUCTION AND GROWTH OF ENZYME-DEFICIENT ISLANDS INVOLVED IN HEPATOCARCINOGENESIS.

(Eng.) Scherer, E. (Dept. Biochemistry, Antoni van Leeuwenhoek Lab., The Netherlands Cancer Inst., 108 Sarphatistraat, Amsterdam, The Netherlands); Emmelot, P. *Cancer Res* 36(7): 2544-2554; 1976.

A single application of various hepatocarcinogens to rats results in the formation of islands of enzyme-deficient liver cells that are mainly irreversible and very probably represent the first cellular stage in liver cancer formation. Comparison of the island-size distributions obtained for different carcinogens indicated that proliferation is a common property of islands. It is independent of the inducing carcinogen and does not need any further presence of carcinogen or other stimulating factors. Toxic doses resulted in an enhanced island size. The number of islands induced by a single dose of carcinogen was enhanced by a prior partial hepatectomy only with the dialkylnitrosamines, dimethylnitrosamine, and diethylnitrosamine. Dose-response relationships measured with diethylnitrosamine, the carcinogen with the lowest toxicity compared with its carcinogenic action, indicated that island formation is due to a one-hit process; that is, one specific alteration in the target cell is responsible for the precancerous transformation. These kinetics and the low probability of transformation might indicate that the crucial hit is scored at the genetic level. The irreversible action of the carcinogen (memory effect) and the influence of time on cancer formation (time effect) are discussed in terms of induction and proliferation of irreversible cell populations serving as precursors of the cancer cell. The number of specific alterations (hits) involved in malignant cancer cell development is calculated to be six, based on the experiments. However, not all of the alterations represent mutational changes, and the number is based on continual administration. Stop experiments indicate that death can occur with less malignant tumors, which may require a smaller number of alterations. (38 references)

5580 A SURVEY OF FISH PRODUCTS FOR VOLATILE N-NITROSAMINES. (Eng.) Iyengar, J. R. (Food Res. Labs., Food Directorate, Health Protection Branch, Health and Welfare Canada, Ottawa, Ontario, Canada K1A 0L2); Panalaks, T.; Miles, W. F.; Sen, N. P. *J Sci Food Agric* 27(6): 527-530; 1976.

A study was undertaken to determine the levels of nitrate, nitrite, and volatile N-nitrosamines of various fish products (halibut, salmon, cod, sole, ocean perch, and scallops). The samples were analyzed for five volatile nitrosamines, namely dimethylnitrosamine (DMN), diethylnitrosamine (DEN), dibutylnitrosamine (DBN), nitrosopyrrolidine (NPyr), and nitrosopiperidine (NPip), all of which are potent carcinogens. Both gas-liquid and thin-layer chromatography were used. The average level of nitrate was 8 parts/10^6 (range 0-94 parts/10^6), and nitrite was present in traces only. Traces of DMN (3-12 parts/10^9) were found in some uncooked (raw) fish. Increased levels of DMN (3-18 parts/10^9) and traces of DEN (4-14 parts/10^9) were observed after baking and frying, indicating formation of these compounds during cooking. None of the samples contained DBN, NPyr, or NPip. In 10 of 17 samples, the identities and levels of DMN and DEN were confirmed by gas-liquid chromatography-high resolution mass spectrometry. (35 references)

5581 THE TIME COURSE OF DNA REPAIR FOLLOWING METHYL NITRONITROSOGUANIDINE (MNNG) TREATMENT OF P388F LYMPHOMA CELLS IN CULTURE. I. ALKALI DISSOCIABLE DNA LESIONS AND THEIR RESTITUTION. (Eng.) Nikaido, O. (Dept. Radiation Biology, Faculty Pharmaceutical Sciences, Kanazawa Univ., Kanazawa, Japan); Fox, B. W. *Chem Biol Interact* 14(1/2): 37-45; 1976.

The pattern of the formation and rejoining of P388F lymphoma cell DNA single-strand breaks was studied by alkaline sedimentation centrifugation following treatment with methyl nitronitrosoguanidine (MNNG). The cells were prelabeled and then treated with various concentrations of MNNG for 1 hr at 37 C. Three periods of single-strand-break formation have been recognized: the first 4 hr when breaks are rapidly formed and rejoined; a medial time range of 10-15 hr following treatment; and a final stage whe the formation of breaks appears to be related to cell-killing processes. The initial phase is attributed to the production and repair of x-ray-like DNA lesions, and the medial time range is more comparable to the enzymatic processes associated with the repair of UV light-induced damage. (20 referenc

5582 PROTECTIVE EFFECT OF MUCIN ON EXPERIMENTA GASTRIC CANCER INDUCED BY N-METHYL-N'-NIT N-NITROSOGUANIDINE PLUS SODIUM CHLORIDE IN RATS. (Eng.) Tatematsu, M. (Nagoya City Univ. Medical Sch., 1 Kawasumi, Mizuho-cho, Mizuho-ku, Nagoya 467 Japan); Takahashi, M.; Hananouchi, M.; Shirai, T.; Hirose, M.; Fukushima, S.; Ito, N. *Gann* 67(2): 223-229; 1976.

The effect of mucin on the induction of gastric carcinomas by N-methyl-N'-nitro-N-nitrosoguandine (MNNG), with or without sodium chloride, was determined in male Wistar rats. Seven groups of rats were treated for 20 wk as follows: Group 1 was give 50 mg MNNG/1 drinking water (renewed daily) and 1 m of 29% NaCl solution once a week and fed on a stock diet supplemented with 4% mucin. Group 2 was given 50 mg MNNG/1 and fed on stock diet supplemented wit 4% mucin. Group 3 received NACL and MNNG. Group 4 was treated with MNNG only. Group 5 was fed on stoc diet supplemented with 4% mucin. Group 6 was given NaCl only. Group 7 was untreated. After 20 wk, the rats were maintained on stock diet and water. Survi ing rats were sacrificed and autopsied after 50 wk and included with rats who had died after 40 wk. Th incidence of gastric cancer in group 3 was significantly higher than that in groups 4 and 1. The diff ences in the incidence of gastric cancer in groups and 4 and of intestinal tumors in groups 1 to 4 we not statistically significant. No malignant tumors were seen in groups 5, 6, and 7. Thus, mucin reduc the high incidence of gastric cancer induced by MN and NaCl to the level induced by MNNG alone, but i had no effect on the incidence of intestinal tumor It is suggested that mucin strengthens the gastric mucosal barrier after injury by NaCl so that it becomes as effective against MNNG as the normal gastric mucosal barrier. (24 references)

5583 THE TIME COURSE OF DNA REPAIR FOLLOWING METHYL NITRONITROSOGUANIDINE (MNNG) TREA MENT OF P388F LYMPHOMA CELLS IN CULTURE. II. DNA REPAIR SYNTHESIS AND ITS CORRELATION WITH STRAND BREAKAGE. (Eng.) Nikaido, O. (Dept. Radiation Biol Faculty Pharmaceutical Sciences, Kanazawa Univ., Kanazawa, Japan); Fox, B. W. *Chem Biol Interact* 14(1/2): 47-55; 1976.

Repair synthesis was measured in P388F lymphoma cell DNA following treatment with N-methyl-N'-nitr N-nitrosoguanidine (MNNG) using a combination of 5-iododeoxyuridine (IUdR) and [^{3}H]thymidine ([^{3}H]-TdR). A pattern of repair synthesis was obtained

ıat was similar in its timing to the initial and
edial stages of single-strand-break formation and
ejoining within the first 24 hr after treatment. A
gher base insertion frequency in relation to
ngle-strand breaks occurs during the medial stage
 repair. However, a fundamental difficulty was
countered with the use of IUdR and [^{3}H]TdR to
easure repair synthesis. An artifactual increase
 repair activity occurred a few hours after treat-
nt; this was due to hydroxyurea-insensitive in-
rporation of [^{3}H]TdR into the heavier IUdR-con-
ining DNA peak and the merging of this peak with
e light-density peak that was used as an index of
epair. (7 references)

84 EXTRAPOLATING FROM ANIMALS TO MAN: CARCINOGENESIS. (Eng.) Eckardt, R. E. (Res. and
vironmental Health Div., Exxon Corp., Linden, NJ).
Occup Med 18(7): 492-494; 1976.

oblems in extrapolating carcinogenesis experiments
 animals to man are reviewed. Direct extrapolation
n be extremely misleading because of species dif-
rences, and certain experimental cancers can be
oduced only in specific animal species that share
common metabolic pathway with man. Beta-naphthyl-
ine, for example, does not induce bladder cancer
 rats or mice but produces tumors in dogs that
osely resemble the bladder cancers seen in dye
rkers. Unlike the rat and mouse, the dog and man
tabolize beta-naphthylamine to its carcinogenic
hydroxylated metabolite. In addition to an under-
anding of metabolic pathways, intelligent extrapola-
on also requires a knowledge of the mechanisms of
rcinogenesis, host protective mechanisms, and
itiation, promotion, or cocarcinogenic factors.
 references)

5 THE BINDING OF ETHYL CARBAMATE TO DNA OF MOUSE LIVER IN VIVO: THE NATURE OF THE
ND MOLECULE AND THE SITE OF BINDING. (Eng.) Pound,
W. (Dept. Pathology, Univ. Queensland, Herston,
ensland, Australia, 4006); Franke, F.; Lawson, T.
Chem Biol Interact 14(1/2): 149-163; 1976.

s work was performed to determine (a) whether
 ethyl or the ethoxy group of urethane bound to
, (b) the nature of the binding of these groups,
 (c) if the nature and site of binding were the
e in intact and hepatectomized mice. Random bred,
e Crackenbush mice, 6-8 wk old, weighing 35-40 g
e used. Isotopically labeled ethyl carbamate was
ected ip into intact and two-thirds-hepatectomized
e in the following doses: [1-^{14}C]ethyl carbamate,
Ci and 10 mg; and [^{18}O]ethyl carbamate, 20 mg.
yl carbamate bound in vivo to the liver DNA of
h intact and partially hepatectomized mice. Iso-
e (^{18}O) enrichment was not detected in the oxygen
liver DNA of mice injected with [^{18}O]ethyl car-
ate. This suggests that it was the ethyl group
 not the ethoxy group that bound to DNA. Chromato-
phic analysis of the acid hydrolysates of liver
 from mice treated with [^{14}C]ethyl carbamate
vided no evidence of alkylation or other form of
ding to purine or pyrimidine bases. On relatively
d acid hydrolysis the alkyl group remained bound to the "apurinic acid" fraction, while more vigorous hydrolysis led progressively first to its separation as highly ionizable hydrophilic nonvolatile compounds and then to its loss as a volatile compound. DNase I followed by phosphodiesterase hydrolysis also split off the ^{14}C-containing group as a volatile compound. This compound was identified as ethanol. These results suggest that the alkyl group was bound as an ester to a phosphate group in the DNA chain. Results with DNA from partially hepatectomized mice did not differ from those with DNA from intact mice. (39 references)

5586 DETECTION OF DIFFERENT TYPES OF DAMAGE IN ALKYLATED DNA BY MEANS OF HUMAN CORRECTIVE ENDONUCLEASE (CORRENDONUCLEASE). (Eng.) Duker, N. J. (Dept. Pathology, New York Univ. Medical Center, New York, NY 10016); Teebor, G. W. *Proc Natl Acad Sci USA* 73(8): 2629-2633; 1976.

Corrective endonuclease (correndonuclease) activity of HeLa cells was assayed with alkylated DNA. Double-stranded, covalently closed DNA from phage PM II (*Pseudomonas*) was treated with methyl methanesulfonate, N-methyl-N-nitrosourea, β-propiolactone, or diepoxybutane to introduce alkylated bases and alkali-labile sites into the DNA. The damaged DNA was incubated with an extract of HeLa cells that catalyzes the formation of breaks at apurinic sites in double-stranded DNA. Methylated DNA was broken at every alkali-labile site by the HeLa correndonuclease, indicating that these sites are similar to the apurinic sites produced by heating at acid pH. DNA alkylated with β-propiolactone or diepoxybutane containing the same number of alkali-labile sites was broken to a far lesser extent. This indicated the presence of a second type of alkali-labile damage that is correndonuclease-insensitive. (33 references)

5587 INDUCTION OF TUMORS IN THE STOMACH AND NERVOUS SYSTEM OF THE ACI/N RAT BY CONTINUOUS ORAL ADMINISTRATION OF 1-METHYL-3-ACETYL-1-NITROSOUREA. (Eng.) Maekawa, A. (Dept. Chemical Pathology, Natl. Inst. Hygienic Sciences, Kamiyooga, Setagayaku, Tokyo 158, Japan); Odashima, S.; Nakadate, M. *Z Krebsforsch* 86(2): 195-207; 1976.

Three groups of ACI/N rats of both sexes received the continuous administration of a 66-ppm (Group I), 30-ppm (Group II), or 13-ppm (Group III) solution of 1-methyl-3-acetyl-1-nitrosourea (Ac-MNU) in their drinking water. Tumors occurred most frequently in the stomach and nervous system. The incidence was highest in the males of Group II, 28/30 (93%), and lowest in the females of Group I, 4/30 (13%). All epithelial tumors of the stomach were benign adenomas except five adenocarcinomas. Neurogenous tumors were more frequently seen in the females. The incidence was highest in the females of Group I, 29/30 (97%), and lowest in the males of Group III, 6/28 (21%). The tumors were predominant in the CNS, especially in the hemispheres. Transplantation studies were done in some of these tumors. Although gastric tumors failed to get positive transplantation, all the neurogenous tumors transplanted were positive. It is concluded that Ac-MNU is a useful carcinogen for selective induction of CNS tumors in rats, but more study is needed for its use in the selective induction of tumors of the glandular stomach. (27 references)

5588 REDUCED DNA REPAIR IN MOUSE SATELLITE DNA AFTER TREATMENT WITH METHYLMETHANESULFONATE, AND N-METHYL-N-NITROSOUREA. (Eng.) Bodell, W. J. (Tumor Biology Lab., Sch. Life Sciences, Univ. Nebraska-Lincoln, Lincoln, NB 68583); Banerjee, M. R. *Nucleic Acids Res* 3(7): 1689-1701; 1976.

DNA repair in mouse (BALB/c) satellite and main band DNA as resolved by Ag$^+$-Cs$_2$SO$_4$ centrifugation was measured in response to treatment with the alkylating agents methyl methanesulfonate and N-methyl-N-nitrosourea. There was a significantly lower incorporation of ^{3}H-thymidine into the satellite DNA compared to the main band was after treatment with the alkylating agents. This suggests a reduced repair activity in the satellite DNA. The extent of binding of ^{14}C-methyl methanesulfonate to the satellite and main band DNA was measured. No difference in binding was observed, indicating that the reduced repair activity of satellite DNA was not due to a difference in the binding of alkylating agents. It is suggested that the reduced incorporation of ^{3}H-thymidine into satellite DNA may be due to its location in the condensed chromatin fraction. (32 references)

5589 EXPERIMENTAL STUDY OF RELATIONSHIP BETWEEN TERATOGENESIS AND CARCINOGENESIS IN THE BRAIN OF THE RAT. (Eng.) Alexandrov, V. A. (N. N. Petrov Res. Inst. Oncology USSR, Ministry Health, 68 Leningradskaya St., Pesochny-2, Leningrad, 188646, USSR); Napalkov, N. P. *Cancer Lett* 1(6): 345-350; 1976.

The effect of combined treatment with methylnitrosourea (MNU) and ethylnitrosourea (ENU) was investigated in Rappolovo rat offspring exposed during the last week of embryogenesis. The incidence of tumors and malformations of the brain in 195 animals of 7 experimental groups showed that the microcephaly (a hypoplastic congenital defect) induced by MNU (5 mg/kg, ip) did not prevent brain tumor induction by ENU (20 mg/kg, iv). Therefore, teratogenic and carcinogenic effects are compatible. A decrease in tumor incidence when the application of MNU (20 mg/kg) followed the administration of ENU could be explained by the cytotoxic lethal effect of MNU. (17 references)

5590 MUTAGENICITY OF METRONIDAZOLE: STRUCTURE-ACTIVITY RELATIONSHIPS. (Eng.) Rosenkranz, H. S. (Dept. Microbiology, Coll. Physicians, Surgeons, Columbia Univ., New York, NY 10032); Speck, W. T.; Stambaugh, J. E. *Mutat Res* 38(3): 203-206; 1976.

Metronidazole [1-(2-hydroxyethyl)-2-methyl-5-nitroimidazole] is widely used as an antiprotozoan and antibacterial agent. Its use is now uncertain since recent findings indicate that it is mutagenic in bacteria. Several synthetic derivatives of the compound were tested in the attempt to find a compoun that is chemotherapeutically effective but not mutagenic. The data indicate the following regarding the mutagenic activity of 5-nitroimidazoles: (substitution at the N-1 position is required, (b) substitution at the C-2 position is permissible bu not required, and (c) substitution at the N-3 position is inhibitory. The fact that not all nitro-containing imidazoles are mutagenic may indicate that it might be possible to dissociate mutagenic activity from antiparasitic activity. (14 reference

5591 CHEMICALLY INDUCED SMOOTH MUSCLE TUMORS THE MOUSE URINARY BLADDER. (Eng.) Jacobs, J. B. (Dept. Pathology, St. Vincent Hosp., Worcest MA 01610); Cohen, S. M.; Arai, M.; Friedell, G. H.; Bulay, O.; Urman, H. K. *Cancer Res* 36(7): 2396-239 1976.

Submucosal tumors of indeterminate origin and without definite connection to the overlying mucosa ha been reported in mice given niridazole. Two male Swiss mice fed the carcinogen developed such tumor They were part of an experiment using three groups of 10-wk-old Swiss mice, 30 males and 30 females i each group, who were fed 0.1%, 0.05%, and 0.025% niridazole in their diet for 30 wk. They were then given control diet for 6 wk, after which they were fed a diet containing half the initial dose of nir azole until death. The two mice who developed submucosal tumors received 0.05% and 0.025% doses, an they died at 72 and 52 wk, respectively. Both tumo were located near the trigone of the urinary bladd and were confined within the subepithelial connect tissue without evidence of invasion. Electron micr scopy of one of the tumors revealed thin myofilame with oval dense bodies, marginal dense plaques, an gap junctions, identifying the tumor as originatin from smooth muscle cells. No desmosomes, tonofilam secretory granules, striated muscle, or collagen were present in the tumor cells. Since the biology of these lesions is unknown, classification as ben or malignant cannot be made at this time. Their recognition is important in evaluating possible bladder carcinogens in mice. (14 references)

5592 DISPOSITION OF [1,2-^{14}C] VINYL CHLORIDE THE RAT. (Eng.) Bolt, H. M. (Institut fu Toxikologie der Universitaet, Wilhelmstr. 56, D-74 Tuebingen, West Germany); Kappus, H.; Buchter, A.; Bolt, W. *Arch Toxicol* 35(3): 153-162; 1976.

Three male Wistar rats, 200-250 g, were exposed to (1,2-^{14}C)-vinyl chloride in an all-glass closed system of 10.3 l volume. To avoid saturation of th metabolizing enzymes, concentrations below 100 ppm were applied. In preliminary experiments, it was found that only about 40% of inspired vinyl chlori is absorbed by the lungs. Uptake of vinyl chloride by the rats was completely blocked by acute pretre ment with potent inhibitors of cytochrome P-450-dependent microsomal drug metabolism (i.e., by 35 mg/kg 3-bromophenyl-4(5)-imidazole or 50 mg/kg 6-nitro-1,2,3-benzothiadiazole in 0.6 ml/kg dimethyl sulfoxide, DMSO). A weaker inhibition was observed

ter pretreatment with 2-diethylaminoethyl-2,2-
phenylvalerate·HCl (SKF-525A) or 5,6-dimethyl-
2,3-benzothiadiazole (50 mg/kg in 0.6 ml/kg DMSO).
tyrapone did not cause inhibition. Uptake of vinyl
loride was increased by pretreatment with 1,1,1-
ichloro-2,2-bis(p-chlorophenyl)ethane (DDT) and,
a lesser extent, with clotrimazol. No significant
imulation of uptake was observed after pretreat-
nt with phenobarbital, 3-methylcholanthrene, rifam-
cin, or chronic ethanol treatment. Immediately
ter exposure, highest radioactivity levels were
served in liver and kidney; the radioactive metab-
ites were rapidly excreted, mainly in the urine
9.4% ± 2.6% within 24 hr). (22 references)

93 ALCOHOL AND CANCER OF BREAST AND THYROID
(Letter to Editor). (Eng.) Pochin, E. E.
atl. Radiological Protection Board, Harwell, Did-
t, Oxfordshire OX11 ORQ). *Lancet* 1(7969): 1137;
76.

a previous communication it was suggested that
ere is an association between alcohol consumption
d an increased incidence of cancers of the breast
d thyroid and of malignant melanoma. A possible
chanism for the increased incidence was also given.
atistical data was compiled on the per capita
cohol consumption in 14 countries. Mortality
tes from breast cancer for these countries show no
gnificant correlation with alcohol consumption.
cidence rates for cancers of the breast and thyroid
five of the countries and of malignant melanoma
four also show no significant correlation with
cohol consumption. The lack, as well, of any sig-
ficant correlation in either sex casts doubt on
e validity of the hypothesis. (5 references)

94 IN VITRO AFLATOXIN B_1 METABOLISM BY HUMAN
LIVER ACROSS INDIVIDUALS (Meeting Abstract).
ng.) Yourtee, D. M. (Biochemistry Dept., Cancer
s. Center, Columbia, MO 65201); Phillips, D. L.
ophys J 16(21-part 2): 234a; 1976.

95 HIGH BLOOD PRESSURE RELATED TO CARCINOGEN-
INDUCED UNSCHEDULED DNA SYNTHESIS, DNA
RCINOGEN BINDING, AND CHROMOSOMAL ABERRATIONS IN
MAN LYMPHOCYTES. (Eng.) Pero, R. W. (Dept. Bio-
emistry, Nucleic Acids Res. Group, Univ. Lund, Box
0, 220 07 Lund, Sweden); Bryngelsson, C.; Mitelman,
; Thulin, T.; Norden, A. *Proc Natl Acad Sci USA*
(7): 2496-2500; 1976.

96 INFLUENCE OF AGE AND SEX ON CARCINOMA AND
CIRRHOSIS OF THE LIVER IN AXC STRAIN RATS
GESTING 0.025% N-2-FLUORENYLDIACETAMIDE. (Eng.)
uber, M. D. (Lab. Biology, NCI, Bethesda, MD 20014).
thol Microbiol 43(1): 31-37; 1975.

97 SHORT COMMUNICATIONS: AN INTESTINAL ARYL-
AMIDASE THAT SELECTIVELY HYDROLYZES CER-
IN AROMATIC AMIDES. (Eng.) Nagasawa, H. T. (Vet-
ans Admin. Hosp., Minneapolis, MN 55417); Kuo, T.
; Shirota, F. N.; Alexander, C. S. *Biochem Pharma-*
l 25(7): 853-858; 1976.

5598 GANGLIOSIDES AND OTHER LIPIDS OF HYPERPLASTIC LIVER NODULES INDUCED BY N-2-FLUORENYLACETAMIDE. (Eng.) Merritt, W. D. (Dept. Biological Sciences, Purdue Univ., West Lafayette, IN 47907); Keenan, T. W.; Morre, D. J. *Cancer Biochem Biophys* 1(4): 179-185; 1976.

5599 EPITHELIAL CELLS IN CULTURE AND THEIR GROWTH RESPONSE TO THE CARCINOGEN BENZO[a]PYRENE (Meeting Abstract). (Eng.) Landolph, J. R. (Lab. Chemical Biodynamics, Lawrence Berkeley Lab., Univ. California, Berkeley, CA 94720); Bartholomew, J. C.; Calvin, M. *J Cell Biol* 67(2/Part 2): 233a; 1975.

5600 ARYL HYDROCARBON HYDROXYLASE INDUCIBILITY AND LARYNGEAL CARCINOMAS (Letter to Editor). (Eng.) Trell, E. (Section Preventive Medicine, Dept. Internal Medicine, Univ. Lund, Lund, Sweden); Korsgaard, R.; Hood, B.; Kitzing, P.; Norden, G.; Simonsson, B. G. *Lancet* 2(7977): 140; 1976.

5601 DRUG METABOLISM IN LIVER TUMORS: RESOLUTION OF COMPONENTS AND RECONSTITUTION OF ACTIVITY. (Eng.) Saine, S. E. (Dept. Biochemistry and Molecular Biology, Univ. Texas Medical Sch. at Houston, Houston, TX 77030); Strobel, H. W. *Mol Pharmacol* 12(4): 649-657; 1976.

5602 NUCLEAR CHROMATIN FRACTIONS FROM MOUSE EMBRYO CELLS: CHARACTERIZATION AND SITE-SPECIFIC BINDING OF A CHEMICAL CARCINOGEN (Meeting Abstract). (Eng.) Webster, R. A. (Mayo Clinic, Rochester, MN); Moses, H. L.; Spelsberg, T. C. *J Cell Biol* 67(2/Part 2): 450a; 1975.

5603 SCANNING ELECTRON MICROSCOPY CHARACTERIZATION OF IN VITRO CHEMICALLY TRANSFORMED CELLS (Meeting Abstract). (Eng.) Malick, L. (Univ. Nebraska Medical Center, Omaha, NB); Langenbach, R. *J Cell Biol* 67(2/Part 2): 257a; 1975.

5604 INHIBITION OF HUGGINS TUMORS BY FORCED RESTRAINT. (Eng.) Newberry, B. H. (Dept. Psychology, Kent State Univ., Kent, OH 44242); Gildow, J.; Wogon, J.; Reese, R. L. *Psychosom Med* 38(3): 155-162; 1976.

5605 HEPATOCELLULAR CARCINOMA AND ORAL CONTRACEPTIVES (Letter to Editor). (Eng.) Henderson, B. E. (Univ. Southern California, Sch. Medicine, Los Angeles, CA); Benton, B.; Edmondson, H. A. *JAMA* 236(6): 560; 1976.

5606 CONCENTRATION-DEPENDENT MUTATION OF DIPLOID HUMAN LYMPHOBLASTS BY METHYLNITRONITROSOGUANIDINE: THE IMPORTANCE OF PHENOTYPIC LAG. (Eng.) Penman, B. W. (Toxicology Group, Dept. Nutrition and Food Science, Massachusetts Inst. Technology, Cambridge, MA 02139); Thilly, W. G. *Somatic Cell Genet* 2(4): 325-330; 1976.

5607 DOSE DEPENDENCE OF MUTATIONS AT THE HYPOXANTHINE-GUANINE PHOSPHORIBOSYL TRANSFERASE LOCUS BY ALKYLATING AGENTS IN CHINESE HAMSTER OVARY CELLS (Meeting Abstract). (Eng.) Hsie, A. W. (Biology Div., Oak Ridge Natl. Lab., Oak Ridge, TN 37830); Brimer, P. A.; O'Neill, J. P.; Couch, D. B. *J Cell Biol* 67(2/Part 2): 182a; 1975.

5608 RAPID ENZYMATIC AND MORPHOLOGICAL CHANGES IN RAT LIVER NUCLEI FOLLOWING NITROSAMINE ADMINISTRATION (Meeting Abstract). (Eng.) Dolbeare, F. A. (Dept. Physiological and Biological Res., Lilly Res. Lab., Indianapolis, IN); Smith, R. E. *J Cell Biol* 67(2/Part 2): 98a; 1975.

5609 A COMBINED IN VITRO IN VITRO APPROACH TO STUDIES OF NITROSAMINE-INDUCED CARCINOGENESIS. (Eng.) Borland, R.; Metcalfe, S. M.; Hard, G. C. *In: Screening Tests in Chemical Carcinogenesis. Proceedings of a Workshop Organized by IARC and the Commission of the European Communities and Held in Brussels, Belgium, 9-12 June 1975.* Montesano, R.; Bartsch, H.; Tomatis, L., eds. International Agency for Research on Cancer. (Lyon, France): IARC Scientific Publications No. 12, pp. 433-447; 1976.

5610 THE INDUCTION OF THYMIDINE KINASE DEFICIENCY IN CULTURED HAPLOID CELLS (Meeting Abstract). (Eng.) Mezger-Freed, L. (Fox Chase Cancer Center, Philadelphia, PA 19111). *J Cell Biol* 67 (2/Part 2): 281a; 1975.

5611 BERYLLIUM INDUCED ERRORS IN DNA SYNTHESIS (Meeting Abstract). (Eng.) Sirover, M. A. (Fox Chase Cancer Center, Philadelphia, PA 19111); Loeb, L. A. *J Cell Biol* 67(2/Part 2): 405a; 1975.

5612 EVALUATION OF THE MUTAGENIC POTENTIAL OF CYCLOHEXYLAMINE ON SPERMATOGONIA OF THE CHINESE HAMSTER. (Eng.) Machemer, L. (Institut fuer Toxikologie, BAYER AG, Wuppertal-Elberfeld, West Germany); Lorke, D. *Mutat Res* 40(3): 243-250; 1976.

5613 FURTHER STUDIES ON THE HISTOLOGICAL, CYTOLOGICAL AND CYTOGENETIC EFFECTS OF NOGALAMYCIN IN MAMMALS. (Eng.) Bempong, M. A. (Biomedical Res. Lab., Norfolk State Coll., Norfolk, VA 23504); Butts, R. M. *Mutat Res* 40(3): 251-259; 1976.

5614 EFFECTS OF CHEMICAL CARCINOGENS AND C-TYPE RNA VIRUSES ON TRANSFORMATION OF MOUSE EMBRYO CELLS (Meeting Abstract). (Eng.) Reiman, H. M. (Mayo Clinic, Rochester, MN); Branum, E. L.; Moses, H. L. *J Cell Biol* 67(2/Part 2): 358a; 1975.

5615 MUTAGENIC ACTIVITY OF STYRENE OXIDE (1, EPOXYETHYLBENZENE), A PRESUMED STYRENE METABOLITE. (Eng.) Milvy, P. (Mount Sinai Sch. Me icine, Fifth Ave. and 100th St., New York, NY 100 Garro, A. J. *Mutat Res* 40(1): 15-18; 1976.

5616 MICROSOME-MEDIATED MUTAGENICITY OF RING SUBSTITUTED 3,3-DIMETHYL-1-PHENYLTRIAZE IN *S. TYPHIMURIUM* G-46 (Meeting Abstract). (Eng.) Kolar, G. F. (German Cancer Res. Centre, Heidelbe West Germany); Malaveille, C.; Bartsch, H. *Mutat* 38(2): 123-124; 1976.

5617 THE UTILITY OF DNA REPAIR SYNTHESIS AS PRESCREEN FOR CHEMICAL CARCINOGENS (Mee ing Abstract). (Eng.) Mitchell, A. D. (Biomedical Res. Dept., Stanford Res. Inst., Menlo Park, CA 94025); McMacken, M. V.; Robinson, D. E. *J Cell* 67(2/Part 2): 288a; 1975.

5618 CHANGES IN THE DISTRIBUTION OF AN IODI ABLE 220,000 MW PROTEIN IN UNTRANSFORM AND CHEMICALLY TRANSFORMED SYRIAN HAMSTER CELLS (Meeting Abstract). (Eng.) Evans, R. M. (Dept. P ology, Univ. Colorado Medical Sch., Denver, CO 8 Fink, L. M.; Clarke, S. M. *J Cell Biol* 70(2/Part 248a; 1976.

5619 THE RELATIONSHIP BETWEEN NEOPLASTIC TR FORMATION AND SOMATIC MUTATION (Meetin Abstract). (Eng.) Barrett, J. C. (Division Bioph Sch. Hygiene, Johns Hopkins Univ., Baltimore, MD 21205); Crawford, B. D.; Ts'o, P. O. P. *J Cell* 70(2/Part 2): 233a; 1976.

See also:

* (Rev): 5401, 5402, 5403, 5404, 5405, 54
5407, 5408, 5409, 5410, 5411, 54
5413, 5414, 5415, 5416, 5417, 54
5419, 5420, 5421, 5422, 5423, 54
5425, 5426, 5436, 5460, 5479, 54
5481, 5482, 5483, 5484, 5487, 54
5489, 5490, 5492, 5493, 5494, 54
5496, 5498, 5500
* (Phys): 5622, 5629, 5638, 5640
* (Viral): 5666, 5668, 5707
* (Immun): 5735, 5741, 5742, 5746
* (Path): 5789, 5797, 5802, 5803, 5819, 5
5853, 5857, 5860
* (Epid-Biom): 5868, 5870, 5871, 5873, 589
5893, 5896, 5897

PHYSICAL CARCINOGENESIS

5620 MOLECULAR MECHANISMS IN RADIATION CARCINOGENESIS. (Eng.) Setlow, R. B. *In: Biology of Radiation Carcinogenesis*. Edited by J. M. Yuhas; R. W. Tennant; J. D. Regan. (New York: Raven Press): pp. 63-65; 1975.

The motivation behind molecular studies of radiation carcinogenesis is the desire to develop theories that permit the extrapolation from cellular and animal models to man. Skin cancer is presently the best example of this type of extrapolation. Two different model systems are presented to help make quantitative predictions concerning the effects of the ozone layer on the incidence of skin cancer in humans. Some of the limitations and variables involved in the calculations are also discussed. (4 references)

5621 RESULTS OF THYROID DIAGNOSIS AFTER RADIOTHERAPY OF THE CERVICAL REGION FOR MALIGNANT TUMORS. (Ger.) Ziegler, R. (Universitaets-Kinderklinik Mainz, Langenbeckstrasse 1, D-6500 Mainz, West Germany); Schoenberger, W.; Gutjahr, P.; Grimm, W. *Monatsschr Kinderheilkd* 124(5): 484-485; 1976.

Thyroids were diagnosed for neoplasia on the basis of 15 and 5 cases of malignant lymphoma (ML) and medulloblastoma (MB), respectively, following long-term radiotherapy at 4,000 R (one ML case at 2,600 R). Protein-bound iodine, T_4(D), T_3 index, FT_4 index, RIA T_3, RIA T_4, and thyroid-stimulating hormone (TSH) were determined at 0 and 30 min after 5 μg/TRH/kg iv. No neoformations appeared in MB. ML showed high TSH values, for which thyroid hormone substitution is recommended. (12 references)

5622 REPAIR OF HUMAN DNA: RADIATION AND CHEMICAL DAMAGE IN NORMAL AND XERODERMA PIGMENTOSUM CELLS. (Eng.) Regan, J. D.; Setlow, R. B. *In: Biology of Radiation Carcinogenesis*. Edited by J. M. Yuhas; R. W. Tennant; J. D. Regan. (New York: Raven Press): pp. 103-113; 1976.

Repair of human DNA damaged by radiation or chemical carcinogens was studied by the bromodeoxyuridine photolysis method. Repair events resembling those seen after UV irradiation can be observed in normal human cells after ionizing radiation. Xeroderma pigmentosum (XP) cells, defective in the repair of UV-induced DNA damage, show defective repair of these UV-like DNA lesions induced by ionizing radiation. Two different repair systems are indicated: the UV-type ('long' repair) takes 20 hr or more and typically involves about 100 nucleotides; the 'short,' ionizing type of repair takes 60 min and involves about 3 nucleotides. The repair of chemically induced damage in human DNA is discussed. XP cells are defective in repairing N-acetoxyacetylaminofluorene (N-acetoxyAAF)-induced lesions; this classifies N-acetoxyAAF as a long-repair inducing agent. Ionizing radiation induces some UV-like lesions in human DNA. These lesions are repaired in the usual prereplication repair mode in normal cells; in XP cells they are poorly repaired, as are the UV-induced pyrimidine dimers. Ethyl methanesulfonate has a UV-type capacity in terms of DNA damage and repair along with its ionizing function. It is suggested that DNA-damaging agents, such as chemical carcinogens, may be classifiable according to the type of damage they induce. (16 references)

5623 DEFICIENCY OF GAMMA-RAY EXCISION REPAIR IN SKIN FIBROBLASTS FROM PATIENTS WITH FANCONI'S ANEMIA. (Eng.) Remsen, J. F. (Dept. Biochemistry, Coll. Medicine, Univ. Florida, Gainesville, FL 32610); Cerutti, P. A. *Proc Natl Acad Sci USA* 73(7): 2419-2423; 1976.

The capacity of preparations of skin fibroblasts from normal individuals and patients with Fanconi's anemia to excise γ-ray products of the 5,6-dihydroxy-dihydrothymine type (t') from exogenous DNA was investigated. Whole-cell and nuclear sonicates of skin fibroblasts were incubated for 40 min with bacteriophage DNA irradiated with ^{137}Cs γ-rays at a dose yielding 0.05%-0.25% of t'. Excision was measured as a function of the initial t' concentration. The excision capacity of whole-cell sonicates of fibroblasts from two of four patients with Fanconi's anemia was substantially below normal. This repair deficiency was further pronounced in nuclear preparations from cells of the same two patients. (25 references)

5624 EXCISION REPAIR OF DNA IN SOME PHOTODERMATOSES. (Eng.) Ichihashi, M. (Dept. Dermatology, Univ. Kobe Sch. Medicine, Ikuta-Ku, Kobe, Japan); Ramsay, C. A. *Br J Dermatol* 95(1): 13-17; 1976.

Excision repair of DNA was measured in two patients with polymorphic light eruption (PLE), three with actinic reticuloid, and two with xeroderma pigmentosum (XP) by estimating unscheduled DNA synthesis in cultured fibroblasts after UV irradiation. The amount of unscheduled DNA synthesis and the action spectrum for this process were estimated in each subject and compared with seven normal subjects. Two subjects with PLE and three with actinic reticuloid exhibited normal levels of DNA repair and normal action spectra. In one subject with classical XP no excision repair could be demonstrated, while in another the amount of repair was lower than normal. The finding of normal DNA excision repair in PLE does not support an earlier claim that this repair process is abnormal in this common photodermatosis. (14 references)

5625 TWO AUTOPSY CASES OF THOROTRAST TUMOR: HISTOLOGICAL AND RADIOLOGICAL STUDIES. (Jpn.) Ariwa, R. (Pathology Lab., Juntendo Univ., Tokyo, Japan). Togawa, K. *Jpn J Clin Radiol* 20(12): 1109-1113; 1975.

Two autopsy cases of pancreatic neoplasm (Case 1) and hepatoma (Case 2) are reported in which Thorotrast was thought to be the carcinogen. Both were adenocarcinomas with metastases to various organs. A particlelike sediment was observed in the pancreas of Case 1 and the liver of Case 2. The x-rays of these organs indicated several abnormal shadows of small size, similar to the x-ray findings observed while the patients were alive. Autoradiograms showed evidence of α-rays in both organs. The γ-ray activity of the liver, measured with a scintillation counter at a distance of 50 cm, was 107 and 704 cpm for Cases 1 and 2, respectively. At a distance of 10 cm, the activity was 1,900.6 and 7,915.5 cpm for Cases 1 and 2. Since both patients had a history of angiography with Thorotrast, a colorimetric determination was made for thorium content in the spleen and liver. The amount of thorium found in the liver and spleen of Case 1 was 1.1 and 0.3 mg/g, respectively, and of Case 2 was 2.3 and 0.3 mg/g. The total amounts in the liver were 119.9 and 1,470 mg for Cases 1 and 2, respectively, and in the spleen were 15 and 24 mg. The time duration from Thorotrast angiography to death was 24 and 28 yr for Cases 1 and 2, respectively. (8 references)

5626 MICROVASCULAR DAMAGE AFTER SINGLE OR FRACTIONATED FISSION NEUTRON OR ^{60}CO γ RAY EXPOSURE: IN VIVO AND ULTRASTRUCTURAL STUDIES (Meeting Abstract). (Eng.) Stearner, S. P. (Div. Biological Medical Res., Argonne Natl. Lab., Argonne, IL 60439); Christian, E. J.; Devine, R. L. *Radiat Res* 67(3): 540-541; 1976.

5627 BONE TUMORS INDUCED BY INHALATION OF ^{238}PuO$_2$ IN DOGS. (Eng.) Park, J. F.; Lund, J. E.; Ragan, H. A.; Hackett, P. L.; Frazier, M. E. *In: VIth International Symposium of the Society for Combatting Cancer in Nordrhein-Westphalia, Dusseldorf, 17-18 October 1975.* Swiss League Against Cancer. (Berlin, West Germany: Springer-Verlag): vol. 54: pp. 17-35; 1976.

5628 EXPERIMENTAL INDUCTION OF BONE TUMORS BY SHORT-LIVED BONE-SEEKING RADIONUCLIDES. (Eng.) Gossner, W.; Hug, O.; Luz, A.; Muller, W. A. *In: VIth International Symposium of the Society for Combatting Cancer in Nordrhein-Westphalia, Dusseldorf, 17-18 October 1974.* Swiss League Against Cancer. (Berlin, West Germany: Springer-Verlag): vol. 54: pp. 36-49; 1976.

5629 AN INVESTIGATION OF THE DNA INVOLVEMENT IN NEOPLASTIC TRANSFORMATION: IN VITRO TRANSFORMATION OF HAMSTER FIBROBLASTS INDUCED BY BrdU INCORPORATION COUPLED WITH IRRADIATION OF NEAR UV LIGHT (Meeting Abstract). (Eng.) Barrett, J. C. (Johns Hopkins Univ., Baltimore, MD); Schectman, L. M.; Ts'o, P. O. *J Cell Biol* 67(2/Part 2): 21a; 1975.

5630 EFFECT OF DNA REPAIR ON THE LOSS OF CLONING ABILITY AND ON THE FREQUENCY OF MUTATIONS INDUCED IN NORMAL HUMAN FIBROBLASTS AND XERODERMA PIGMENTATION BY ULTRAVIOLET IRRADIATION (Meeting Abstract). (Eng.) McCormick, J. J. (Michigan Cancer Foundation, Detroit, MI 48224); Curren, R. D.; Ouellette, L. M.; Maher, V. M. *J Cell Biol* 67(2/Part 2): 272a; 1975.

5631 THE PERSISTENCE OF CHROMOSOMAL ABERRATION IN PATIENTS WITH HYPERTHYREOSIS TREATED WITH I^{131} (Meeting Abstract). (Eng.) Pendic, B. (Clinical Hosp. Belgrade, Baja Sekulica 172, 11000 Belgrade, Yugoslavia); Barjaktarovic, N. *Health Phy* 31(3): 277; 1976.

5632 CONVERSE RESPONSE OF CELLS WITH FINITE AN INFINITE LIFESPANS TO IONIZING RADIATION (Meeting Abstract). (Eng.) Macieira-Coelho, A. (Institut de Cancerologie et d'Immunogenetique (INSERM 94800-Villejuif, France); Diatloff, C.; Malaise, E. *J Cell Biol* 67(2/Part 2): 253a; 1975.

5633 MODEL FOR IRREPARABLE CELL DAMAGE INDUCED BY IONIZING RADIATION OF DIFFERENT QUALITIES (Meeting Abstract). (Eng.) Cole, A. (Physics Dept., Univ. Texas System Cancer Center, Houston, T 77025); Datta, R. *Biophys J* 16(21-part 2): 184a; 1976.

5634 CONFORMATIONAL CHANGES BEFORE AND AFTER DNA SYNTHESIS ENHANCE CYTOGENETICALLY LETHAL RADIATION INJURY. (Ger.) Hagemann, G. (Medizinische Hochschule, 3000 Hannover-Kleefeld, Karl Wiechert Allee 9, West Germany); Mellmann, J. *FEBS Lett* 60(2): 388-390; 1975.

5635 PHOTO-INDUCED DNA-PROTEIN ADDUCTS IN CHIN HAMSTER OVARY CELL CHROMATIN (Meeting Abstract). (Eng.) Rall, S. C. (Cellular and Molecul Radiobiology Group, Los Alamos Scientific Lab., Los Alamos, NM): Hardin, J. M.; Strniste, G. F. *J Cell Biol* 67(2/Part 2): 351a; 1975.

5636 THE DOSE-RESPONSE RELATIONSHIP FOR ULTRAVIOLET-LIGHT-INDUCED MUTATIONS AT THE HYPOXANTHINE-GUANINE PHOSPHORIBOSYLTRANSFERASE LOCU IN CHINESE HAMSTER OVARY CELLS. (Eng.) Hsie, A. W. (Biology Div., Oak Ridge Natl. Lab., Oak Ridge, TN) Brimer, P. A.; Mitchell, T. J.; Gosslee, D. G. *Soma ic Cell Genet* 1(4): 383-389; 1975.

5637 DIFFERENCES IN POTENTIATION OF MELANOMA GROWTH BY ABSORBABLE AND NONABSORBABLE SUTURE. (Eng.) Pendergrast, W. J., Jr. (Section Immunology and Cell Biology, NCI, NIH, Baltimore Cancer Res. Center, 3100 Wyman Park Drive, Baltimor MD 21211); Futrell, J. W.; Mardiney, M. R. *J Surg Oncol* 8(3): 223-228; 1976.

5638 STABLE INHERITED MODIFICATIONS OF GENE EXPRESSION IN MAMMALIAN SOMATIC CELLS AFTER EXPOSURE TO MUTAGEN (Meeting Abstract). (Eng.) Siciliano, M. J. (M. D. Anderson Hosp. and Tumor Inst., Univ. Texas System Cancer Center, Texas Medical Center, Houston, TX 77030); Humphrey, R. M. *J Cell Biol* 70(2/Part 2): 204a; 1976.

5639 **EFFECTS OF DNA REPAIR DEFECTS ON THE POST-ULTRAVIOLET COLONY-FORMING ABILITY OF HUMAN FIBROBLASTS IN VITRO** (Meeting Abstract). (Eng.) Andrews, A. D. (Natl. Cancer Inst., Bethesda, MD); Barrett, S. F.; Robbins, J. H. *J Cell Biol* 67(2/Part 2): 10a; 1975.

5640 **RADIATION AND ARYL HYDROCARBON HYDROXYLASE IN MICE** (Meeting Abstract). (Eng.) Prasad, N. (Baylor Coll. Medicine, Houston, TX); Prasad, R.; North, L. B.; Bushong, S. C. *J Cell Biol* 67(2/Part 2): 344a; 1975.

See also:

* (Rev): 5402, 5406, 5407, 5408, 5427, 5428, 5429, 5430, 5431, 5486, 5491, 5497, 5498, 5499, 5501, 5502, 5510
* (Chem): 5550
* (Viral): 5668, 5695
* (Immun): 5769
* (Epid-Biom): 5869, 5889

5641 MAREK'S DISEASE VIRUS DNA IN A CHICKEN LYMPHOBLASTOID CELL LINE (MSB-1) AND IN VIRUS-INDUCED TUMORS.

(Eng.) Lee, L. F.; Nazerian, K.; Boezi, J. A. *In: Oncogenesis and Herpesviruses II. Part 2: Epidemiology, Host Response and Control. Proceedings of a Symposium held in Nuremburg, Federal Republic of Germany, 14-16 October 1975.* International Agency for Res. on Cancer. (Lyon, France): pp. 199-204; 1975.

Day-old chicks were inoculated with 100,000 chicken lymphoblastoid cells (MSB-1) or with 500,000 cells from duck embryo fibroblasts infected with either the GA or JM strains of Marek's disease virus (MDV). The chicks were sacrificed 1 wk after the appearance of symptoms of Marek's disease. Complementary RNA (cRNA) hybridization experiments with DNA from GA-MDV infected chick embryo fibroblasts showed a binding of approximately 22.5%. This amount did not vary up to 40 passages and represents approximately 130 genomes. The groups injected with GA and MSB-1 showed visceral tumors, while those injected with JM showed predominately lymphoid lesions in the nerves. The amount of MDV DNA in tumors ranged from 22 to 80 genome equivalents in the three groups. cRNA hybridization from the tumors showed no variation within the chick but varied greatly from chick to chick. The significance of this variation is not known.

5642 INDEPENDENT REGULATION OF ENDOGENOUS AND EXOGENOUS AVIAN RNA TUMOR VIRUS GENES.

(Eng.) Hayward, W. S. (The Rockefeller Univ., New York, NY 10021); Hanafusa, H. *Proc Natl Acad Sci USA* 73(7): 2259-2263; 1976.

^{3}H-Labeled complementary DNA specific for the envelope glycoprotein (env) gene of avian leukosis-sarcoma viruses was isolated by selective nucleic acid hybridization techniques and used to analyze the expression of the endogenous provirus. The endogenous provirus, in certain cell types termed chicken helper factor positive (chf+), can synthesize the envelope glycoprotein. Env DNA sequences were present in both chf+ and chf- cells, but env RNA was detectable only in positive cell types. When these cells were infected with the Bryan strain of Rous sarcoma virus (BH-RSV), a defective virus that is deleted in the env gene, the levels of endogenous env RNA remained unchanged, although exogenous BH-RSV-specific RNA was synthesized in very high amounts. Thus, the infecting virus did not appear to influence the expression of the endogenous virus. Similarly, the endogenous virus did not influence the exogenous virus expression, since comparable amounts of BH-RSV-specific RNA were present in all infected cell types, regardless of the level of endogenous virus expression. (42 references)

5643 DETECTION OF NUCLEOTIDE SEQUENCES ASSOCIATED WITH TRANSFORMATION BY AVIAN SARCOMA VIRUSES.

(Eng.) Stehelin, D. (Institut de Recherches Scientifiques sur le Cancer, BP No. 8, F-94800 Villejuif, France); Varmus, H. E.; Bishop, J. M. *Bibl Haematol* (43): 539-541; 1976.

Infection of fibroblasts by avian sarcoma viruses (ASV) leads to neoplastic transformation of the host cell, which may be the result of a single viral gene. To study the mechanism of transformation, radioactive DNA (cDNAsarc) complementary to nucleotide sequences that represent most or all of the viral gene(s) responsible for transformation was prepared. The distribution of nucleotide sequences homologous to cDNAsarc among various tumor viruses and among the nucleic acids extracted from normal virus-transformed cells is described. Hybridization experiments were performed between cDNAsarc and a large excess of the viral RNA or DNA to be tested. All the strains of ASV tested contained nucleotide sequences closely related to cDNAsarc. RNA from avian leukoses viruses and temperature-dependent mutants isolated from ASV strains showed no hybridi
tion with cDNAsarc, although they were competent fo
hybridization with cDNAb$_{77}$ (DNA complementary to th
RNA genome of the Bratislava 77 strain of ASV). No sequences homologous to cDNAsarc were found with RN
from viruses oncogenic in mammals, and negative results were also found for DNA tumor viruses teste
Normal avian DNA contained nucleotide sequences related to cDNAsarc. It appears that cDNAsarc repre
sents a nucleotide sequence that arose and diverged
during avian speciation; part or all of the sequenc
homologous to cDNAsarc in ASV were probably derive
from the chicken genome or a species closely relat
to the chicken. Experiments also supported the ide
that the sequences homologous to cDNAsarc in ASV evolved from cellular nucleotide sequences but hav
been altered considerably in the process. (2 references)

5644 CALCIUM-DEPENDENT REGULATORY PROTEIN OF CYCLIC NUCLEOTIDE METABOLISM IN NORMAL
TRANSFORMED CHICKEN EMBRYO FIBROBLASTS.

(Eng.) Wa
terson, D. M. (Dept. Microbiology and Immunology, Duke Univ. Medical Center, Durham, NC 27710); Van Eldik, L. J.; Smith, R. E.; Vanaman, T. C. *Proc N*
Acad Sci USA 73(8): 2711-2715; 1976.

The concentration of a calcium-binding protein modulator of 3':5'-cyclic-nucleotide phosphodiest
activity was increased in chicken embryo fibrobla
upon transformation by Rous sarcoma virus. This modulator protein from fibroblasts, which has rou
the same molecular size, charge, and functional properties as that isolated from chicken brain, comprised approximately 1.32% of the soluble prot
in homogenates of fibroblasts infected and transformed by Rous sarcoma virus. In comparison, the modulator comprised approximately 0.30% of the so
protein in homogenates of normal fibroblasts fro
confluent cultures and 0.36% of the soluble prote
in homogenates of fibroblasts infected with a tra
formation-defective mutant of Rous sarcoma virus. Modulator levels in normal fibroblasts at subcon
ent cell densities were 0.42%-0.76% of the homog
soluble protein; i.e., between that found in con
ent normal fibroblasts and in fibroblasts transf
by Rous sarcoma virus. These observations sugges
that the modulator protein levels are elevated u
conditions in which chicken embryo fibroblasts a
undergoing rapid growth and have decreased cycli
AMP levels. (29 references)

645 UPTAKE OF EXOGENOUS METABOLITES BY VIRUS-TRANSFORMED CELLS: CHANGES INDUCED BY EMPERATURE AND PH. (Eng.) Bader, J. P. (Chemistry ranch, NCI, NIH, Bethesda, MD 20014); Lew, M. A.; rown, N. R. *Arch Biochem Biophys* 175(1): 196-208; 976.

ates of uptake of a variety of exogenous metab- lites were measured in chick embryo (CE) cells and n CE cells transformed by Rous sarcoma virus, Bryan igh-titer strain (RSV-BH). Deoxyglucose uptake was reater in transformed than in nontransformed cells. ess substantial increases in uptake of galactose, ridine, thymidine, and leucine were found in trans- ormed cells. A mutant of RSV-BH, RSV-BH-Ta, allowed nfected cells to behave as nontransformed cells at 1 C, but when shifted to 37 C cells became trans- ormed. In RSV-BH-Ta cells shifted from 41 to 37 C ncreased capacities for uptake of all tested com- ounds were prevented by actinomycin D or cyclohex- mide, but not cytosine arabinoside, demonstrating hat new RNA and protein synthesis was required for ptake enhancement. The pH of the culture medium ver the pH range 6.6 to 7.8 was critical to cellular ptake capacity for deoxyglucose, but had little nfluence on capacity for uptake of galactose, ridine, thymidine, or leucine. Changes induced by H occurred in both nontransformed and transformed ells, and these changes occurred in the presence of ctinomycin D or cycloheximide. Both the V and Km of eoxyglucose uptake changed when cells became trans- ormed by RSV-BH-or RSV-BH-Ta. However, only V hanged with changes in pH. Neither the lower Km haracteristic of transformed cells nor the higher m of nontransformed cells were affected by pH. (45 eferences)

546 INFECTIOUS VIRAL DNA IN ROUS SARCOMA VIRUS-TRANSFORMED NONPRODUCER AND PRODUCER ANIMAL LLS. (Eng.) Hill, M.; Hillova, J.; Dantchev, D.; ariage, R.; Goubin, G. *In: Tumor Viruses. Cold ring Harbor Symposia on Quantitative Biology*. Cold ring Harbor Lab. (Cold Spring Harbor, NY): vol. , pp. 1015-1025; 1975.

udies of the structure and infectivity of the ral DNA of avian tumor viruses are presented. Non- roducer and producer Rous sarcoma virus (RSV)-trans- ormed cells and producer nontransforming virus- nfected cells were shown to harbor viral DNA specify- g the respective avian tumor virus. In nonproducer us sarcoma cells, the residing viral DNA was lin- r, double-stranded, and covalently linked to the romosomal DNA. Both double- and single-stranded rms of RSV DNA transfected chicken cells, the rogeny virus being indistinguishable from the DNA rent with respect to its morphological, biological, d antigenic properties. Unlike the DNA extracted om nonproducer RSV-transformed mammalian cells, e DNA extracted from producer RSV-transformed icken cells gave rise, in transfection experiments, both sarcoma virus and its nontransforming deriv- ive. However, the DNA from nontransforming virus- fected chicken cells generated only nontransforming ruses. The frequency of nontransforming virus covery was different from that of sarcoma virus covery, the latter being a nonlinear function of the amount of transfecting DNA, while the former appeared to suggest a linear relationship. On the other hand, the end-point dilution of transfecting DNA for sarcoma virus recovery was approximately the same as that for nontransforming virus recovery. It is suggested that sarcoma viruses and nontransforming derivatives are recovered from two different species of viral DNA that carry or lack, respectively, the transforming genetic material. The size of double-stranded viral DNA is substantially smaller than 20 x 10^6 daltons. In transfection experiments, the sarcoma virus DNA was first integrated into the host cell genome before being expressed, while the non-transforming viral DNA apparently bypassed the integration step. The latter DNA appears to generate the progeny virus when taken up, carried, and transcribed in a permissive cell. (58 references)

5647 THE ORIGIN OF 7 S RNA IN VIRIONS OF AVIAN SARCOMA VIRUSES. (Eng.) Erikson, E. (Dept. Pathology, Univ. Colorado Medical Center, Denver, CO 80220); Erikson, R. L. *Virology* 72(2): 518-522; 1976.

Duck and chick embryo fibroblasts infected with the Prague C strain of Rous Sarcoma virus (RSV) were studied to determine the origin of the 7S RNA. The fibroblasts were labeled with $^{32}PO_4^{-3}$, and cellular 7S RNA was purified. Ribonuclease T_1 digests were prepared and the resulting oligonucleotides fractionated by two-dimensional electrophoresis. Duck 7S RNA lacked one large oligonucleotide present in chicken 7S RNA, thus establishing that the two species contain 7S RNAs of different sequence. The Prague C strain of RSV was grown in each type of host, and the 7S RNA found in progeny virus was examined. It was identical to that of the host that produced the virus. (10 references)

5648 THE POSSIBLE SIGNIFICANCE OF THE PRESENCE OF C-TYPE VIRUS PARTICLES IN PLACENTA OF NORMAL HEALTHY SPRAGUE-DAWLEY RATS. (Eng.) Gross, L. (Cancer Res. Unit, Veterans Administration Hosp., Bronx, NY 10468); Schidlovsky, G. *Bibl Haematol (Basel)* (43): 252-254; 1976.

The presence of type C virus particles in the placentas of 3/6 young healthy Sprague-Dawley rats, shown by electron microscopy, was elevated. The finding is considered significant because this strain spontaneously develops a high incidence of a variety of tumors. An electron microscopic examination of 14 spontaneous rat tumors and 4 primary, spontaneous rat leukemias did not reveal any virus particles. In contrast, leukemias and lymphosarcomas induced in Sprague-Dawley rats (or in rats of other strains) by Gross mouse leukemia virus always contain C virus particles in the thymic and mesenteric tumors and in the spleen, bone marrow, blood cells, and blood plasma. The nature of the particles in the rat placenta remains to be determined, but a working hypothesis is that they may represent the passage of latent, presumably oncogenic viruses transmitted vertically from parents to offspring. If this hypothesis is correct, most of these latent oncogenic viruses are transmitted directly with the genetic cell components and are undetectable. In the passage from one generation to another, however, a few virus particles may be formed, emerging temporarily from their latency before being reincorporated into the cell genetic components of the next generation. (5 references)

5649 THE EPIDEMIOLOGY AND VIROLOGY OF C-TYPE VIRUS-ASSOCIATED HEMATOLOGICAL CANCERS AND RELATED DISEASES IN WILD MICE. (Eng.) Gardner, M. B. (Dept. Pathology, Univ. Southern California Sch. Medicine, Los Angeles, CA 90033); Henderson, B. E.; Estes, J. D.; Rongey, R. W.; Casagrande, J.; Pike, M.; Huebner, R. J. *Cancer Res* 36(2): 574-581; 1976.

Wild house mice in Southern California were studied to detect spontaneous cancer and type C virus expression. Mice were trapped and observed in the laboratory for the rest of their life span; more than 5,400 mice were trapped in 6 areas over a period of 35 mo. Mice from two areas exhibited an unusually high prevalence (> 80%) and titer (1:4 to 1:16) of spleen complement fixation gs antigen, C particles, and infectious virus at the time of trapping. Upon aging in the laboratory, these mice showed an increased incidence of lymphoma and a lower limb paresis resembling amyotrophic lateral sclerosis. Further studies established the indigenous C virus of these mice as the essential etiological factor in both diseases. In these two groups there was also an increased incidence of breast carcinomas, hepatomas, and pulmonary adenomas associated with C virus compared with the tumor-resistant groups. There may be an immune deficiency specific for C particles and certain transformed lymphoid and epithelial cells in the tumor-prone mice. The influence of radioactivity and environmental carcinogens was ruled out. These results, when applied to humans, demonstrate that familial clusters of leukemia cases, lymphomas, and tumors of hemopoietic origin should be examined for evidence of C virus association. The development of vaccines to strengthen host-immune responsiveness to viral- and tumor-specific antigens may prove feasible. (24 references)

5650 EXPRESSION OF VIRAL AND/OR HEMOGLOBIN ANTIGENS IN FRIEND VIRUS ERYTHROLEUKEMIC CELLS TREATED WITH DIMETHYL SULFOXIDE AND/OR INTERFERON. (Eng.) Ramoni, C. (Lab. Physics, Istituto Superiore di Sanita, I-00161 Rome, Italy); Rossi, G. B.; Grappelli, C. *Bibl Haematol (Basel)* (43): 445-447; 1976.

The pattern(s) of expression of hemoglobin (Hb) and/or viral antigen(s) in Friend leukemia virus (FLV)-induced leukemic cells treated with either dimethyl sulfoxide (DMSO) or DMSO and interferon was investigated by immunofluorescence. DMSO was added to the medium at the time of cell seeding (1%, v/v); interferon was added on day 1. Cells were collected daily for 5 days. Cells from untreated control cultures were negative for Hb on days 1 and 2, with some sporadic immunofluorescence being observed during the following days; FLV-positive cells were rare. The majority of cells from DMSO-treated cultures became increasingly positive for Hb from day 3 on; FLV-positive cells were also evident and widespread even on day 1 and remained so for 5 days. Cells treated with both DMSO and 1,000-2,000 units/ml/10^5 cells interferon were Hb-negative throughout; FLV positivity, however, was marked. Under these conditions, FLV virion production was abundant in DMSO-treated cultures, absent in cultures given DMSO and 2,500 units of interferon, and markedly reduced in cultures given DMSO and 250 units of interferon. These results indicate that treatment of DMSO-induce Friend leukemia cells with mouse interferon causes an inhibition of Hb and FLV production, but an increased accumulation of FLV antigen(s) in the cytoplasm. The observation of sizable amounts of FLV-antigen(s) in cells treated with interferon under conditions in which production of fully mature virions was abolished may be explained by assuming that interferon blocks the synthesis of a late viral protein necessary for virus assembly or blocks the export of virus. (8 references)

5651 KINETIC MODEL OF FRIEND VIRUS-INDUCED LEUKEMIA. (Eng.) Smadja-Joffe, F. (Inst. Cancerology and Immunogenetics, Inserm, Paul-Brouss Hosp., F-94800 Villejuif, France); Klein, B.; Kerdi C.; Jasmin, C. *Bibl Haematol (Basel)* (43): 451-452; 1976.

Autoradiographic studies and cytological observations of the spleens of mice with polycythemic Frie virus (FVP)-induced leukemia indicated that Friend leukemic cells proliferate rapidly in the spleen. These cells have two main characteristics not previ ously described in transplanted leukemia: (a) an unaltered cellular proliferation rate at the platea phase of the leukemic spleen growth (no decrease in the growth fraction and no lengthening of the cell cycle duration), and (b) a large cell loss factor (94%) during the exponential phase of the leukemic spleen growth. A rapid and intense cell death, begi ning after one or two divisions, explains the large cell loss. A model of FVP-induced leukemia, based c these kinetic data, is characterized by a pathologi cal increase in the number of proerythroblasts and basophilic erythroblasts, the transition from a well-regulated erythropoiesis to a neoplastic eryth blastosis being primarily due to a permanent virus-induced differentiation of erythropoietin-responsi cells (ERC) into proerythroblasts. This step of differentiation escapes from normal homeostatic control and results in a permanent cell leakage fr the ERC compartment, which leads to an increase in the stem cell compartment. In this model, the presence of true malignant cells endowed with an unlim ed capacity for proliferation is not necessary because the uncontrolled acceleration of erythropoie results mainly from the perturbation of homeostati control. (3 references)

5652 COMPARISON BETWEEN AN AVIAN AND A MURINE VIRAL REVERSE TRANSCRIPTASE-RNase H COMPLEX. (Eng.) Moelling, K. (Justus-Liebig-Universit Fachbereich Humanmedizin, Frankfurter Str. 107, D-6300 Giessen, West Germany). *Bibl Haematol (Base* (43): 121-124; 1976.

Some of the enzymatic properties of the Friend rine leukemia virus (Fr-MuLV) reverse transcriptase-Nase H complex, consisting of a single polypeptide 84,000 molecular wt, were compared to those of e avian α subunit as representative of a degraded zyme and to the αβ avian enzyme complex as represen- ative of a functional reverse transcriptase-RNase mplex. Mild protease treatment of the avian enzyme creased the amount of α (70,000 molecular wt) at e expense of β (110,000 molecular wt), indicating at α arises as a degradation product of β. Similar eatment of the Fr-MuLV enzyme generated additional lypeptides of 78,000, 70,000, and 50,000 molecular . The mammalian viral enzyme and the αβ-containing ian enzyme complex were able to transcribe natural A templates efficiently. The murine viral RNase H owed a progressive exonucleolytic mode of action. e degraded Fr-MuLV enzyme complex resembled the ian α subunit, which is deficient in natural RNA anscription and lacks double-stranded DNA synthesis. s RNase H is a random exonuclease. In further zyme characterizations, it will be necessary to be areful not to describe the properties of a degraded zyme. (12 references)

53 ANALYSIS OF HOST MECHANISMS INVOLVED IN SUPPRESSION OF ESTABLISHED FRIEND VIRUS UKEMIA. (Eng.) Wheelock, E. F. (Dept. Microbiology, omas Jefferson Univ., Philadelphia, PA 19107). *bl Haematol* (43): 508-510; 1976.

model is described that has permitted study of e Friend leukemia virus (FLV)-induced depression immune responsiveness to both viral and nonviral tigens. Infection of DBA/2 mice with FLV suppressed th humoral and cell-mediated immunity and produced rapidly fatal erythroleukemia in all mice. Treat- nt (3 days after FLV infection) with a single oculation of statolon, an extract of mycophage- fected *Penicillium stoloniferum*, induced inter- ron, cleared FLV from the circulation, and restored mune responsiveness to both nonleukemic and FLV- ukemic antigens. The lethal infection was converted to a dormant one, with FLV persisting in a sup- essed state for many months. The suppressive ef- cts of statolon were potentiated by pretreatment th chlorite oxidized oxyamylose (COAM). However, search has indicated that certain immune and nonim- une specific host functions that are depressed in ukemic mice can be restored to normal levels of mpetence without associated leukemosuppression. r example, transient restoration of macrophage nction is probably caused by the interferon pro- uced after statolon treatment. It is suggested that tatolon has a stimulatory effect on B lymphocytes, eading to an immune response to antigens that have reviously been encountered by these cells, and that e FLV cytotoxic antibody is of critical importance leukemosuppression. When FLV cytotoxic antibody roduction was accelerated by use of COAM with stat- lon, the leukemosuppressive effects of statolon ere greatly increased. Additional evidence that the mune response against FLV antigens is crucial for eukemosuppression was provided when silica-treated ice failed to mount an immune response to FLV leu- emic antigens, and thus FLV leukemosuppression was locked. (13 references)

5654 INCREASE OF AKR-SPECIFIC SEQUENCES IN TUMOR TISSUES OF LEUKEMIC AKR MICE. (Eng.) Berns, A. (Lab. Biochemistry, Univ. Nymegen, Geert Grooteplein N21, Nymegen, The Netherlands); Jaenisch, R. *Proc Natl Acad Sci USA* 73(7): 2448-2452; 1976.

AKR mice produce, from shortly after birth, high titers of their endogenous Gross type murine leukemia virus and develop a thymus-derived leukemia at 7-9 mo of age. Molecular hybridization experiments showed that this oncogenesis is accompanied by an increase in the number of AKR-specific DNA sequences in the tumor tissues, whereas the ''nontarget'' organs are not affected. Sequence increase was determined by kinetic analysis of DNA reassociation using an AKR-murine leukemia virus (MuLV)-specific complementary DNA (cDNA) and also by hybridization with excess AKR cDNA. The AKR cDNA was selected to recognize AKR sequences without significant cross-reaction with DNA sequences of other endogenous viruses. The results show that during the development of the leukemia, the number of AKR-MuLV-specific genes increases in tumor tissues by a factor of 1-1/2 to 2. (17 references)

5655 SEQUENCE RELATEDNESS OF MAMMALIAN VIRAL RNA GENOMES AND RNA SPECIES RELEASED BY HUMAN NEOPLASTIC CELLS. (Eng.) East, J. L. (Dept. Virology, Univ. Texas System Cancer Center, M.D. Anderson Hosp. and Tumor Inst., 6723 Bertner Ave., Houston TX 77030); Knesek, J. E.; Chan, J. C.; Maruyama, K.; Priori, E. S.; Dmochowski, L. *Bibl Haematol* (43): 484-487; 1976.

High molecular wt (HMW) RNA species released by human sarcoma and lymphoma cell cultures and associated with particulate components were examined for the presence of nucleotide sequences that are shared with viral RNA genomes of representative mammalian RNA tumor viruses. The following RNA tumor viruses were studied: Rauscher murine leukemia virus (MuLV-R), Gross murine leukemia virus (MuLV-G), a murine virus related to MuLV-G and produced by a normal BALB/c mouse mammary gland cell culture (MRTV-MG), Moloney murine sarcoma virus (MSV-M), Kirsten murine sarcoma virus (MSV-K), woolly monkey simian sarcoma virus (SSV), Rickard feline sarcoma virus (FeSV-R), and the feline endogenous virus RD-114. Cross-hybridization tests revealed that the murine virus group could be divided into four separate but related subgroups. Little or no interspecies sequence relationship was found for SSV, FeSV-R, or RD-114. All of the HMW RNA species from the one human lymphoma and five human sarcoma cell cultures had large sedimentation constants (62S-71S) similar to those of viral RNA genomes of RNA tumor viruses. Four of the HMW RNA species were tested further. In cross-hybridization experiments to determine their relatedness, positive hybridization values were found with complementary DNA transcripts of sarcoma viruses, but not with those of leukemia viruses. All four HMW RNA species cross-hybridized, to varying degrees, with complementary DNAs of MSV-M and FeSV-R. Three of the HMW RNA species, osteosarcoma-392 (OS-392), fibrosarcoma-B (FS-B), and Burkitt's lymphoma-433 (BL-433), annealed with complementary DNA of MSV-K to a low extent and with that of SSV to an even lower extent. The other RNA species (FS-437) failed to anneal with complementary DNA of MSV-K and was not tested with that of SSV. Additional testing suggested that the hybridizable portion of the HMW RNA species of OS-392 is closely related to a region of the viral RNA genome of MSV-M that possibly contains a high content of guanine plus cytosine. (10 references)

5656 EFFECT OF FV-1 GENE PRODUCT ON PROVIRAL DNA FORMATION AND INTEGRATION IN CELLS INFECTED WITH MURINE LEUKEMIA VIRUSES. (Eng.) Jolicoeur, P. (Institut de Recherches Cliniques de Montreal, 110 Ouest Avenue des Pins, Montreal, Canada); Baltimore, D. *Proc Natl Acad Sci USA* 73(7): 2236-2240; 1976.

The synthesis of proviral DNA and its integration into cellular DNA were studied in Fv-1n/n mouse cells (strains NIH/3T3, SIM) resistant to B-tropic murine leukemia viruses and in Fv-1b/b cells (strains JLS-V9, SIM.R) resistant to N-tropic viruses. The amounts of unintegrated murine leukemia virus-specific DNA detected by molecular hybridization in extracts of Fv-1n/n or Fv-1b/b cells after infection with N- or B-tropic viruses were the same in both permissive and resistant cells. Therefore, formation of DNA products from the viral RNA template does not appear to be grossly affected by the Fv-1 gene product. Integration of virus-specific DNA into chromosomal cellular DNA was assayed by hybridization of radioactive complementary DNA to DNA from infected cells. With either NIH/3T3 or SIM.R cells infected with N- or B-tropic viruses, integration of proviral DNA could be detected in permissive cells but not in nonpermissive cells. The Fv-1 gene product therefore appears to prevent integration of proviral DNA. (38 references)

5657 COLONIZATION OF THE MOUSE LIVER BY TRANSPLANTED VIROGENIC LEUKEMIA CELLS. ELECTRON MICROSCOPIC INVESTIGATIONS. (Ger.) Fasske, E. (Pathol. Abtlg., Forschungsinstitut Borstel, D-2061 Borstel, West Germany); Fetting, R.; Ruehland, D.; Schubert, T.; Themann, H. *Z Krebsforsch* 84(3): 257-269; 1975.

An experimental model designed to examine the nature of tumor destruction of healthy tissue--invasive compression or enzymatic lysis--is presented. Young, inbred NMRI mice of both sexes received transplants sc (back skin) or injections ip of myelocytic leukemia cells containing A particles and mature and immature C particles. Sacrifice was at various intervals from 10 hr to 21 days, and light and electron microscopic studies of liver specimens were made. No lytic erosion of the liver parenchyma was found at any time. At 10 hr the leukemic cells were in the sinusoids and at 30 hr they were in the periportal fields. Invasion followed the cytoplasmic processes between endothelial cells into the spaces of Disse, where the leukemic cells proliferated and subsequently compressed the parenchyma. Hepatocyte displacement and destruction followed. RNA virus proliferation was conspicuous in the leukemic cells and was independent of the disease stage. Immature, budding C particles formed on the cell surfaces, and extracellular mature particles were seen. Immature A particles, with two concentric electron-dense shells, were grouped in areas with a highly developed Golgi appa tus and a low ribosome composition. B particles do not occur, nor is there any viral relation to the chromosomes. (38 references)

5658 BIOCHEMICAL PROPERTIES OF A VIRUS IN RADI GENIC LEUKEMIA IN C57BL MICE. (Fre.) Astier, T. (I.N.S.E.R.M., Unite 117, Fondation Bergor 180, rue Saint-Genes, 33076 Bordeaux Cedex, France) Guillemain, B.; Duplan, J.-F. *C R Acad Sci* [*D*] *(Pa* 282(12): 1225-1228; 1976.

Analysis shows that RadLV-D, a virus of radiogenic leukemia in C-57 white mice, possesses a series of biochemical properties warranting its inclusion in the oncornavirus group. The cell cultures included the G-36, G-36-C1, 13-3-C, and RNV1-C1 strains. Centrifugation of the purified labeled extracts le to the isolation of a peak of radioactivity in a density zone between 1.15 and 1.17 g/cm^3. Electron microscopy showed many type C viral particles in t fractions corresponding to this peak. For the RNA study, the virus furnished by the G-36-C1 and 13-3 strains was used. The viral genome was a RNA molec (70S) that could be dissociated by heat (80 C, 5 min) into subunits of 30-35S and into molecules of 4-5S. An endogenous reverse transcriptase showed u in all the virus extracts prepared from the four c strains. In a balanced gradient, the transcriptase activity remained confined to the density zone of virus. The enzyme reaction product underwent compl hydrolysis under the influence of DNase but resist RNase. No synthesis of polydeoxyribonucleotides to place. In a sucrose gradient, the early reaction p duct migrated in the same way as viral RNA. After addition of RNase, the sum of the radioactivity included in the reaction product could be found in the lighter fractions of the gradient. Molecular hybridization showed that the synthesized product was a DNA, over 80% of which was complementary to viral RNA. (8 references)

5659 VIRION INTERACTION IN MOUSE LYMPHOMAS. (Eng.) Vredevoe, D. L. (Lab. Nuclear Medicine and Radiation Biology, Center Health Science Univ. California, Los Angeles, CA 90024); Hays, E. F. *Cancer Res* 36(2): 370-374; 1976.

Virion expression in filtrates of lymphomas in AKR/J or C3H/HeJ mice was assayed by two technique (a) in vitro infectivity (XC assay), or (b) accele tion of oncogenicity in vivo (O assay). The two assays appeared to detect different virus populati or activities. This was shown when the same filtra were tested in parallel by the XC and O tests, and opposite results were obtained on the two assays, e.g., XC+ O- or XC- O+. It was postulated that the two viruses, termed "XC+" and "O" to correspon to the assays used to detect them, were involved i oncogenesis. When originally virus induced lympho were passaged by cells in two- to three-mo-old syngeneic AKR or C3H mice, oncogenic activity of filtrates of these transplanted lymphomas decreased a cell passages increased. These filtrates from C3H ymphomas also had decreased XC activity as cell assages increased. Normal lymphoid tissue from one- o five-mo-old AKH mice was XC+ O-, while from C3H ice it was XC- O-. Thus, the two strains modified ctivities lacking in their normal tissues. Filtrates ighly oncogenic in XC+ newborn AKR mice were onco- enic in C3H newborn mice only when sufficient XC+ irus was in the inoculum received by the XC- C3H ice. Thus the XC+ virus appeared to play a synergis- ic role with a postulated O virus in oncogenesis.

660 ABOUT THE HETEROGENEITY OF THE MURINE ONCORNAVIRUS GROUP-SPECIFIC ANTIGEN GS-1.

Ger.) Denner, J. (Zentralinstitut fuer Krebsforschung er AdW der DDR, DDR-1115 Berlin-Buch, Lindenberger eg 70, East Germany); Dorfman, N. A. *Arch Geschwul- tforsch* 46(3): 176-182; 1976.

he heterogeneity of the species-specific antigen, s-1, from the Rauscher leukemia virus (RLV) virion nd from plasma and spleen extracts of RLV-infected ALB/c mice was confirmed. Gs-1 was recovered in hree pH zones, 4.45-5.5, 5.65-6.0, and 6.45-6.6, by soelectric focusing (IF). Immunoelectrophoresis of irus-free plasma showed a somewhat longer precipita- ion line than that for spleen extract; plasma gs-1 as also more heterogeneous by polyacrylamide gel lectrophoresis. Gs-1 was present in all six zones etween pH3 and pH10 by IF. Both plasma and virion s-1 have the same isoelectric point. Two alternative xplanations of heterogeneity are proposed: either s-1 binds with different classes of polynucleotides hat occur free in the plasma or the extract, or here are structural differences in protein, or roteolytic breakdown, molecules with gs-1 determinants. (15 references)

661 TRANSLATION OF RAUSCHER LEUKEMIA VIRUS RNA IN HETEROLOGOUS CELL-FREE SYSTEMS. (Eng.)

alden, M. H. (Dept. Biochemistry, Univ. Nijmegen, eert Grooteplein Noord 21, Nijmegen, The Netherlands); Gielkens, A. L.; Bloemendal, H. *Biochim iophys Acta* 425(2): 208-219; 1976.

he translation of Rauscher leukemia virus RNA (RLV NA) was studied in a number of mammalian cell-free ystems. Krebs II ascites tumor cells were propagated y serial transplantation ip in B10.D2 mice. JLS-V9 ells, derived from bone marrow cells of Balb/c mice nd productively infected with RLV, were grown as onolayers. Addition of denatured (30S-40S) RLV RNA o heterologous cell-free systems generally resulted n a fourfold stimulation of amino acid incorpora- ion in vitro compared with native (60S) RLV RNA hat gave only a twofold stimulation. The RLV-specific olypeptides synthesized in the heterologous cell- ree systems were detected by direct and indirect mmunoprecipitation. Only polypeptides synthesized n response to RLV RNA were immunoprecipitable. Only %-5% of the trichloroacetic acid-precipitable ^{35}S-methionine counts incorporated above the background adioactivity were precipitable. This may be due to timulation of the endogenous system after addition f RLV RNA or to the lack of antigenicity of a number f newly synthesized RLV-specific polypeptides. The polypeptides synthesized in the heterologous cell-free systems partially comigrate electrophoretically with native viral proteins synthesized in vivo in JLS-V9 cells. In addition to 72,000-, 65,000-, and 50,000-dalton polypeptides, a 15,000-dalton polypeptide was also synthesized in vitro. In the cell-free systems supplemented with the S-100 fraction from JLS-V9 cells, the same set of virus-specific polypeptides are synthesized with the same efficiency, supporting the conclusion that apparently no virus-specific factors are involved in the translation of this RNA. (20 references)

5662 GLYCOLYTIC ENZYME ACTIVITIES IN MURINE SARCOMA VIRUS-TRANSFORMED CULTURES OF BALB 3T3: THE ROLE OF CULTURE DENSITY.

(Eng.) Gregory, S. H. (Dept. Microbiology, St. Louis Univ. Sch. Medicine, 1402 South Grand Blvd., St. Louis, MO 63104); Kumari, H. L.; Lakshmi, M. V.; Bose, S. K. *Arch Biochem Biophys* 175(2): 644-653; 1976.

The effects of transformation by murine sarcoma virus and of increasing cell density on the activities of several key glycolytic enzymes in Balb 3T3 cells were tested. Hexokinase levels increased with culture density in the uninfected and in the two transformed (HB2 and KA31) cultures. Phosphofructokinase did not increase with culture density in the uninfected cells but rose dramatically in dense cultures of virus-transformed cells. 6-Phosphogluconate dehydrogenase and glucose-6-phosphate dehydrogenase levels were high in sparse cultures of uninfected cells and decreased steadily with increased culture density. Pyruvate kinase levels increased with density only in KA31 cultures. A density-dependent decrease in the level of hexokinase type II with a concomitant increase in type I isozyme occurred in uninfected 3T3 cultures. This change was negligible in HB2 cells. (42 references)

5663 METHODS FOR DETECTION OF ONCORNAVIRUSES IN HUMAN TUMORS.

(Eng.) Steinke, H.; Laufs, R.; Dorfler, W. *In: Molecular Base of Malignancy: New Clinical and Therapeutic Evidence*. Deutsch, E.; Moser, K.; Rainer, H.; Stacher, A., eds. (Stuttgart: Georg Thieme Publishers): pp. 221-223; 1976.

Methods to detect oncornaviruses in tumor tissue, especially those that do not depend on completely expressed type C viruses, are of great diagnostic interest. One such method, the simultaneous detection test for RNA-instructed DNA polymerase and high molecular wt (70S) RNA (two diagnostic features of RNA tumor viruses), was used to examine tumorous spleens from BALB/c mice infected with Rauscher leukemia virus (RLV), tissue from C3H mice infected with mouse mammary tumor virus (MMTV), and NC-37 cells carrying simian sarcoma virus type 1 (SSV-1). The presence of RNA-instructed ^{3}H-DNA was analyzed in a glycerol sedimentation velocity gradient. Mouse tumors induced with RLV and MMTV resulted in a distinct peak of acid-precipitable ^{3}H-TTP with a sedimentation coefficient of 70S; this peak represents complexes that contain 70S RNA molecules. The ^{3}H-DNA product obtained from NC-37 cells infected with

SSV-1 was precipitated with ethanol and analyzed on a Cs_2SO_4 gradient. Part of the product banded in the RNA region. Complexes of ^{3}H-DNA and RNA obtained in the 70S region from the NC-37 cells were precipitated with two volumes of ethanol in the presence of 0.2 M NaCl at -20 C for 12 hr and treated with 0.5 M NaOH at room temperature for 4 hr to hydrolyze any RNA present. The radioactive DNA banded solely in the DNA region. Annealing reactions between ^{3}H-DNA of SSV-1 (1,000 to 2,000 cpm) and RNA from polysomes of cells infected with SSV-1 (300 μg) were performed in 0.4 M NaCl-50% formamide-50% 5 mM EDTA at 37 C for 24 hr. About 40% of the input ^{3}H-DNA from SSV-1 hybridized to the polysomal RNA from the NC-37 cells. A lacking partial expression of an oncornavirus genome does not rule out a silent oncornavirus genome in the tumors. (7 references)

5664 INDUCTION OF TUMORS BY A GUINEA PIG HERPESVIRUS-TRANSFORMED HAMSTER CELL LINE.

(Eng.) Michalski, F. J. (Dept Lab. Medicine, Yale Univ. Sch. Medicine, New Haven, CT 06510); Fong, C. K. Y.; Hsiung, G. D.; Schneider, R. D. *J Natl Cancer Inst* 56(6): 1165-1170; 1976.

Syrian hamster embryo cells that had been transformed in vitro by guinea pig herpeslike virus (GPHLV) were found to be oncogenic when inoculated into hamsters sc or ip. Of 71 animals inoculated, 30 showed tumors at the site of inoculation. Tumors appeared 4-23 wk after inoculation of the transformed cells at passage 37 or higher. Inbred and randombred hamsters of all ages were susceptible. Upon microscopic examination the tumors were characterized as fibrosarcomas. The cultured hamster tumor cells were easily transplanted into hamsters, but produced no evidence of tumors when inoculated into guinea pigs. Infectious GPHLV was not isolated from the tumor cells, but GPHLV-specific surface antigens were detected in tumor cells by immunofluorescence of GPHLV antiserum produced in rabbits. Sera from tumor-bearing hamsters did not contain GPHLV-neutralizing antibodies, but sera from 4 of 23 hamsters bearing primary tumors and 12 of 41 bearing transplanted tumors produced nuclear fluorescence in cells infected with GPHLV, thus establishing the relationship between the guinea pig herpesvirus and the hamster tumors. (12 references)

5665 THE EPIDEMIOLOGY OF FELINE LEUKEMIA VIRUS INFECTION.

(Eng.) Jarrett, W. F. (Dept. Veterinary Pathology, Univ. Glasgow Veterinary Sch., Bearsden Rd., Bearsden, Glasgow G61 1QH, Scotland). *Bibl Haematol (Basel)* (43): 209-211; 1976.

The overall incidence of feline leukemia virus (FeLV) infection in urban and rural natural cat communities was estimated by serological techniques that detect antibodies directed at a group-specific antigen expressed on the membranes of infected cats. In several hundred cats from an agricultural area, the incidence of antibody positives was 6%, but in an adjacent industrial city, the incidence was 40%. Only 6% of kittens under 5 mo had antibodies and all of these had been exposed to stray cats. In the 6-mo age group, the number of positives rose to 29%, and in cats over 3 yr old it was 74%. This indicates both a high level of contact exposure and repeated episodes of infection. The fact that the rate in stray cats was twice that of domestic pets indicate a horizontal transmission and a higher degree of exposure to vectors. Three main categories of cat exist with respect to FeLV: (a) animals with a high CMA antibody titer and immunity to reinfection with FeLV; (b) cats with a high CMA antibody titer coexi ing with a viremia; and (c) cats in which a viremia is present accompanied by a negative or low CMA antibody titer associated with FeLV-induced immunos pression. In the last group there is a high frequen of neoplasia and other diseases. The great majority of young cats are unprotected at the time they star to mix freely with older cats, and therefore vaccin tion could play a major part in controlling this disease. (10 references)

5666 INTERACTION BETWEEN CHEMICAL CARCINOGENS, ONCOGENIC VIRUSES AND 17β-ESTRADIOL.

(Eng Blakeslee, J. R. (Dept. Veterinary Pathobiology, Coll. Veterinary Medicine, 201 Sisson Hall, 1900 Coffey Road, Columbus, OH 43210); Yohn, D. S.; Milo G. E.; Hart, R. W. *Bibl Haematol* (43): 481-483; 1976.

An attempt was made to determine whether 17β-estradiol, simian virus 40 (SV40), and the chemical carcinogens N-methyl-N'-nitro-N-nitrosoguanidine (MNNG and benzo(a)pyrene (BP) interacted to modify schedu and unscheduled DNA synthesis. Treatment of Detroit 550 human foreskin fibroblast cells with the DNA-damaging chemical carcinogens resulted in enhanced SV40 transformation. MNNG enhanced transformation when applied prior to virus infection, while BP did so when applied both before and after infection. 17β-Estradiol enhanced transformation only when treatment followed virus infection. The data sugge that BP, MNNG, and 17β-estradiol do not function by alteration of cellular membranes with increased virus adsorption. Cells damaged with BP or MNNG an treated with 0.1 or 1.0 μg/ml 17β-estradiol stimulated scheduled DNA synthesis; 10 μg/ml was inhibitory. Concentrations that stimulated DNA synthesis enhanced virus transformation independent of carcinogen treatment and acted synergistically with MNNG to produce additive enhanced virus transforma tion. 17β-Estradiol at 1.0 and 10.0 μg/ml inhibite unscheduled DNA synthesis, while 0.1 μg/ml had no effect. It is suggested that the effect of 17β-est diol on virus transformation is dose-dependent. (6 references)

5667 MONOMER MOLECULAR WEIGHT OF T ANTIGEN FR SIMIAN VIRUS 40-INFECTED AND TRANSFORMED CELLS.

(Eng.) Carroll, R. B. (Dept. Pathology, New York Univ. Medical Center, 550 First Ave., New Yor NY 10015); Smith, A. E. *Proc Natl Acad Sci USA* 73(2254-2258; 1976.

Tumor (T) antigens from simian virus 40 (SV40)-transformed and lytically infected cells were isolated by immunoprecipitation and their molecular w estimated by sodium dodecyl sulfate-polyacrylamide gel electrophoresis. T antigen from SV40-transform

ouse and hamster cells has an apparent molecular wt
f 94,000, whereas that from several lines of SV40-
nfected monkey cells is 84,000. In a wheat germ
ell-free system, messenger RNA from either trans-
ormed or productively infected cells is translated
nto a 94,000 species. Experiments with the protease
nhibitors L-1-(tosylamide-2-phenyl)ethylchloromethyl
etone HCl and N-α-p-tosyl-L-lysylchloromethyl ketone
Cl suggest that the 84,000 species of T antigen
ound in infected cells is derived from the larger
pecies by proteolytic cleavage. Further, the cleavage
athway probably involves a two-step reaction with
n 89,000 intermediate. The biological significance
f the two molecular wt forms of T antigen is un-
nown, but the possibility that they have different
hysiological activities is discussed. (40 references)

568 ENHANCEMENT OF SV40 TRANSFORMATION BY TREATMENT OF C3H2K CELLS WITH UV LIGHT AND
AFFEINE. II. THE EFFECTS OF MULTIPLICITY OF INFEC-
ION, CELL PHASE, AND TIME WITH CAFFEINE. (Eng.)

de, T. (Dept. Pathology, Temple Univ. Sch. Medicine,
iladelphia, PA 19140); Anzai, K.; Andoh, T. *Virol-
gy* 72(2): 480-485; 1976.

e effects of multiplicity of infection (MOI),
ell phase at time of infection, and length of incuba-
ion with caffeine and/or UV radiation on the enhance-
ent of simian virus 40 (SV40) transformation was
udied in the C3H2K cell line (C3H/H2 mouse kidney).
e transformation frequency of the cells was propor-
ional to the viral dose between an MOI of 10^3 and
^{4} (one-hit response). Treatment of cells with UV
5 ergs/mm^2) or caffeine (1 mM) enhanced the trans-
rmation frequency without affecting the linearity
the reaction. When irradiated cells were infected
th virus and incubated with caffeine, the trans-
rmation frequency was not proportional to the
rus dose and far exceeded the expected response if
and caffeine acted additively. The maximum trans-
rmation frequency was 45%. Experiments with par-
ally synchronized cultures indicated that cells
ssing through the late S phase were highly suscep-
ble to transformation. However, the enhancement of
ansformation by UV and/or caffeine did not appear
depend upon a particular period in the cell cycle.
e transformation frequency of unirradiated cells
creased progressively during a 4-day incubation
th 1 mM caffeine, after which time it leveled off.
contrast, when cells were UV-irradiated prior to
rus infection and then incubated in the presence
caffeine, the enhancement appeared in the early
riod of incubation, reaching a maximum within 24
. The latter time course was coincident with that
the repair process of UV-damaged DNA, as judged
om unscheduled DNA synthesis. (20 references)

59 AN ANALYSIS OF THE STRUCTURE OF THE REPLICATING FORK DURING DISCONTINUOUS SYNTHESIS
SV40 DNA AND THE DETECTION OF GAP CIRCLE INTER-
DIATES. (Eng.)

Laipis, P. J.; Levine, A. J. *In:
mor Virus-Host Cell Interaction*. Edited by A.
lber. (New York: Plenum Press): pp. 21-37; 1975.

ese experiments deal with two of the four stages
of simian virus 40 (SV40) DNA replication: the polynucleotide chain propagation step and the processing of the post segregational 16S intermediate to form mature viral DNA. They attempt to elucidate the detailed structure of the nascent 4S fragments and the longer progeny strand found at the replication fork of SV40 DNA. SV40-infected African green monkey kidney cells (AGMK) were pulse-labeled with ^{3}H-thymidine to yield replicating molecules labeled preferentially in the 4S fragments, and longer labeling times in the presence of hydroxyurea (HU) were used to yield replicating molecules with the same properties. The DNA fugation and sedimentation through a neutral sucrose gradient, then used as a template in an in vitro DNA synthesizing system. The addition of hU to SV40-infected AGMK cells resulted in an 85%-95% decrease in the incorporation of ^{3}H-thymidine into SV40 replicating DNA. The residual viral DNA synthesized was initially in the form of 4S-5S fragments, which were hydrogen-bonded to SV40 replicating molecules in all stages of duplication. These oligonucleotides appeared to be a normal intermediate in polynucleotide chain propagation. The 4S fragments, hydrogen-bonded to the template strands at the replication forks, were separated from themselves and from progeny molecules by gaps of one or more nucleotides; the gaps were bounded by 3'OH and 5'PO$_4$ groups. About 20% of the 4S fragments were not joined to the longer polynucleotide strand in vitro. It is unclear why the inhibition of DNA replication by HU results in a gap between the 4S fragments and the longer growing progeny strands while the 4S fragments are themselves synthesized. (49 references)

5670 SOME PROPERTIES OF SUPERHELICAL OLIGOMERIC AND INTEGRATED SV40 DNA SEQUENCES. (Eng.)

Sauer, G.; Kuhn, C.; Kammer, K.; Waldeck, W. *In: Tumor Virus-Host Cell Interaction*. Edited by A. Kolber. (New York: Plenum Press): pp. 59-67; 1975.

Some properties of simian virus 40 (SV40) DNA sequences that are covalently linked with host cell DNA are discussed. Two situations are considered: (a) oligomeric SV40 DNA with integrated host DNA sequences; and (b) linear duplex DNA consisting of SV40-host DNA sequences in productively infected cells. Oligomeric SV40 DNA was isolated and purified, and the oligomers were immobilized, after denaturation, on filters and hybridized with either monomeric SV40 superhelical DNA or with host DNA in DNA-DNA hybridization reactions. There was a large discrepancy in base sequence homology between oligomers and monomeric SV40 DNA that cannot be explained by the presence, in host oligomeric SV40 DNA molecules, of host DNA sequences capable of hybridizing under these conditions. It is concluded that oligomeric SV40 DNA must contain approximately 15% of unique host DNA sequences incapable of hybridizing either with monomeric SV40 DNA or with repetitive host DNA. Integration of SV40 DNA sequences into host DNA during productive infection is a regular event that is independent of the multiplicities of infection. Substantial amounts of viral DNA sequences occur in the form of covalently linked viral-host DNA sequences. SV40 DNA sequences are particularly enriched in small DNA duplex molecules contained in the Hirt supernatant after selective extraction of the DNA at the end of the productive cycle. Integration also takes place in the macromolecular host DNA, but to a much lesser extent. Data from ultrasonic treatment and alkaline velocity sedimentation of material recovered from the light band of the Hirt supernatant (before and after hybridization to and elution from SV40 and CV-1 DNA) led to the following conclusion: within the range of 800 bases the integration site in mammalian DNA in these particular molecules must consist of reiterated host DNA sequences that are either directly adjacent to the viral DNA sequences or separated by only a few unique base sequences from the integrated viral sections. (5 references)

5671 INFLUENCE OF CELL DISSOCIATION PROCEDURES ON THE TUMORIGENICITY OF SIMIAN VIRUS 40 TRANSFORMED FIBROBLASTS.

(Eng.) Tenforde, T. S.; Risius, J.; Beckman, A.; Tobias, C. A.; Gurney, E. (Lawrence Berkeley Lab.: Berkeley): 15 pp; 1975.

Quantitative assessment was made of the effects of three factors (host immune status, number of cells in the challenge inoculum, and dissociation technique). used to remove cells from tissue culture dishes prior to injection, on the tumorigenicity of a clonal line of simian virus 40 (SV40)-transformed mouse fibroblasts. The following clonal lines were used: 3T3, derived from a BALB/c embryo culture; SV-T2, an SV40-transformed line derived from the same embryo culture; and D3, a revertant cell line derived from an SV-T2 culture. Cells were dissociated from the culture dishes by two procedures: a 5-min exposure at 27 C to a combination of trypsin (2.5 mg/ml) and EDTA (3 mM), and a 10-min exposure at 27 C to 3 mM EDTA alone. The tumor-forming ability of 3T3, SV-T2, and D3 cells, injected sc, was tested in syngeneic 6-wk-old BALB/c male mice. The injected dose of SV-T2 cells necessary for the production of progressively growing tumors in 50% of recipient mice (TPD_{50}) was significantly lower (16.2-fold) for trypsin-EDTA dissociated cells than for EDTA dissociated cells. Thus, a significantly greater in vivo proliferative capacity was seen for the former procedure. Immunosuppression of recipient mice with 300-rad whole-body irradiation lowered the TPD_{50} for trypsin-EDTA and EDTA dissociated SV-T2 cells by 2.4 and 7 times, respectively; the difference was significant only for the latter procedure. No tumor growth was noted during the 2-mo assay period in normal or immunosuppressed (300 rads) 6-wk-old BALB/c mice following sc injection of 10^7 3T3 or 10^7 D3 cells prepared by either dissociation procedure. (19 references)

5672 THE EFFECT OF SV40 TRANSFORMATION ON THE CHROMOSOMAL PROTEINS OF 3T3 MOUSE EMBRYO FIBROBLASTS.

(Eng.) Krause, M. O. (Dept. Biology, Univ. New Brunswick, Fredericton, Canada); Noonan, K. D.; Kleinsmith, L. J.; Stein, G. S. *Cell Differentiation* 5(2): 83-96; 1976.

The composition of chromosomal proteins in normal and simian virus 40 (SV40)-transformed NIH/Swiss 3T3 mouse embryo fibroblasts was determined by polyacryl amide gel electrophoresis. Nonhistone chromosomal protein peaks B, F', G', G, and H were more pronounced in SV40-transformed cells; components of the high molecular wt A-complex were more pronounced in normal 3T3 cells. The nonhistone protein:histone ratios in normal and SV40-transformed cells were similar. Protease inhibitors such as L-1-tosylamide-2-phenyl-ethyl-chloromethyl-ketone (TPCK) were necessary to prevent loss of a broad molecular wt spectru of nonhistone proteins from both cell types. Comparison of the rates of nonhistone protein synthesis in normal and SV40-transformed 3T3 cells indicated 1.6 to 2-fold increases in transformed cells in the specific activities of nonhistone proteins migrating in regions A-B, C-F, and G-H. Cytosine arabinoside inhibited DNA synthesis in both normal and transformed cells by 96%; the inhibition, evident in the 10,000-20,000 and 35,000-38,000 dalton regions, was attributed primarily to histones. Transformed cells showed an increased rate of synthesis of nonhistone proteins when labeled with leucine-^{3}H and an increas in specific activity when labeled with tryptophan-^{3}H The nonhistone protein phosphorylation rate was greater in transformed than in normal cells. Relative amounts of individual histone fractions from both types of cells were similar; differences appear with respect to synthesis rates and extent of phosphorylation. Variation in the relative protein content of specific molecular wt classes of nonhistone polypeptides may be attributed to SV40 transformation in different cell types, rather than to serine proteases. Overall loss of nonhistone proteins in the absence of TPCK was greater in SV40-transformed than normal cells, possibly indicating higher protease activity in transformed cells. Differences in synthesis rates of some histone fractions can be interpreted as related to their strength of binding in chromatin. (43 references)

5673 REGULATION OF ACTIVE α-AMINOISOBUTYRIC ACI TRANSPORT EXPRESSED IN MEMBRANE VESICLES FROM MOUSE FIBROBLASTS.

(Eng.) Lever, J. E. (Dept. Cell Regulation, Imperial Cancer Res. Fund, Lincoln' Inn Fields, London WC2A 3PX, England). *Proc Natl Acad Sci USA* 73(8): 2614-2618; 1976.

Membrane vesicles isolated from untransformed Balb/c and Swiss mouse fibroblasts and from those transform by a simian virus (SV40) catalyzed the carrier-mediated uptake of L-α-aminoisobutyric acid. Concentrative uptake required the presence of a Na^+ gradient (external Na^+ > internal Na^+) and occurred independently of endogenous (Na^+ K^+) ATPase activity. This process was electrogenic, since uptake was stimulate by a K^+ diffusion gradient (internal > external) in the presence of valinomycin or by the addition of the Na^+ salt of a permeant ion. Both the initial rate of concentrative uptake of L-α-aminoisobutyric acid and its maximal accumulation, driven by a standard Na^+ gradient, were decreased in vesicles from density-inhibited, untransformed cells and increased in those from cells transformed by SV40 compared with vesicles from proliferating untransformed cells An increased maximal velocity (Vmax) of uptake stimulated by Na^+ gradient was observed in vesicles from transformed cells compared with those from untrans-

rmed cells, suggesting an increase in the number
carriers or in their mobility. Since the relative
tent of accumulation of this model amino acid
iven by a standard Na$^+$ gradient also differed with
owth or transformed status, an additional possibil-
y for cellular regulation of this process could be
teration of membrane Na$^+$ permeability or carrier
sponse to Na$^+$. (25 references)

74 SODIUM-STIMULATED α-AMINOISOBUTYRIC ACID
TRANSPORT BY MEMBRANE VESICLES FROM SIMIAN
RUS-TRANSFORMED MOUSE CELLS. (Eng.) Hamilton, R.
(Molecular Biology Lab., Salk Inst., P. O. Box
09, San Diego, CA 92112); Nilsen-Hamilton, M. *Proc
tl Acad Sci USA* 73(6): 1907-1911; 1976.

a prelude to a comparison of the transport
operties of membrane vesicles (MV) derived from
rmal and transformed cells, the uptake of α-amino-
obutryic acid (AIB) by MV was studied. Uptake of
B by MV derived principally from the plasma mem-
ane and endoplasmic reticulum of mouse 3T3 cells
ansformed by simian virus 40 was stimulated by
dium chloride. Both in the presence and absence of
$^+$, uptake was time-dependent and osmotically sensi-
ve. The Na$^+$-stimulated uptake was inhibited by
her amino acids. The kinetics of AIB transport
re shown to be biphasic both in whole cells and in
e membrane vesicles. Only the high affinity system
s stimulated by sodium in the membrane vesicles.
ese results demonstrate that observations made on
ving cells correlate with observations made on
olated membrane vesicles and indicate that these
mbrane vesicles have retained a functionally in-
ct cellular amino acid transport system. (36 ref-
ences)

5 DIRECT BIOCHEMICAL MAPPING OF EUKARYOTIC
VIRAL DNA BY MEANS OF A LINKED TRANSCRIP-
N-TRANSLATION CELL-FREE SYSTEM. (Eng.) Rozenblatt,
(Center Cancer Res., Massachusetts Inst. Technol-
, Cambridge, MA 02139); Mulligan, R. C.; Gorecki,
Roberts, B. E.; Rich, A. *Proc Natl Acad Sci USA*
8): 2747-2751; 1976.

ions of eukaryotic viral DNA coding for specific
teins were mapped by a linked transcription-trans-
ion cell-free system primed with DNA fragments
erated by restriction endonucleases. Three simian
us 40 (SV40) DNA fragments derived from that
ion of the DNA expressed late in lytic infection
e purified (*Hpa* I-A (0.76-0.175 map unit), *Bgl*
*co*RI-B (0.672-0), and *Hpa* II-*Eco*RI-B (0.735-0)).
se fragments efficiently stimulated the incorpora-
n of [^{3}H]uridine triphosphate and [^{35}S]methionine
o trichloroacetic acid-insoluble material in the
ked system. The location of the region of DNA
ing for the viral structural proteins VP1, VP2,
VP3 was determined from the spectrum of polypep-
e synthesis directed by the individual intact
gments and their specific endonucleolytic digests.
polypeptides synthesized in the cell-free system
e characterized on urea-sodium dodecyl sulfate
yacrylamide gradient gels and by two-dimensional
ptic peptide analysis. The region of SV40 DNA
encoding the information for VP1 was between 0.835 and 0.175, VP2 was between 0.76 and 0, and VP3 was between 0.835 and 0 map unit. With this mapping data, comparisons of the tryptic digests, and the coding capacities of the respective DNA fragments, the regions coding for the three structural proteins relative to one another were located on the physical map of SV40 DNA. VP2 and VP3 are probably coded for by overlapping DNA sequences. (32 references)

5676 THE BLOOD COAGULATION SYSTEM IN EXPERIMENTAL VIRAL HEMOBLASTOSIS IN MONKEYS. (Eng.) Fomenko, V. N. (Inst. Experimental Pathology and Therapy, USSR Acad. Medical Sciences, Gora Trapetziya, Sukhumi, USSR). *Exp Pathol (Jena)* 12(2): 65-80; 1976.

The severity of disturbances in hemocoagulation was studied in 108 monkeys (*Papio hamadryas* and *Macaca arctoides*) with hemoblastosis induced by the inoculation of virus-containing materials from patients with leukemia. Forty-two monkeys of the same species were used as controls. The changes in the blood coagulation system appeared early, preceding the development of clinical symptoms, and had the same trend in both monkey species. The extent of alterations in blood coagulation was proportional to the severity of the symptoms of hemoblastosis. Thrombocyto-megakaryocytograms of monkeys showed an increased percentage of degenerative and involutive forms. The dynamic function of the thrombocytes and the general coagulation tests was disturbed, prothrombin consumption was decreased, and fibrinolytic activity was increased. With the onset of clinical remission, hemostasis was not accompanied by full restoration of the thrombocytogram and the coagulogram. Some monkeys showed hemorrhagic diathesis, more often of the light type. The development of the hemorrhagic syndrome in the severe type was accompanied by more pronounced hemostatic changes leading to functional alterations in the thrombocytes and megakaryocytes and also to changes in stages I and III of blood coagulation. (52 references)

5677 SIMIAN VIRUS 40 (SV40) TUMOR-SPECIFIC PROTEINS IN NUCLEUS AND PLASMA MEMBRANE OF HELA CELLS INFECTED BY ADENOVIRUS 2-SV40 HYBRID VIRUS AD2$^+$ND2. (Eng.) Deppert, W. (Max-Planck-Institut fuer biophysikalische Chemie, D34 Goettingen, Postfach 968, West Germany); Walter, G. *Proc Natl Acad Sci USA* 73(7): 2505-2509; 1976.

HeLa cells infected with the nondefective adenovirus 2-simian virus 40 (SV40) hybrid virus (AD2$^+$ND2) have previously been shown to synthesize two SV40-specific proteins with molecular wt of 56,000 and 42,000. The present study demonstrates that these proteins are immunoprecipitable with serum from hamsters bearing SV40 tumors. By peptide analysis, it was shown that the 56 and 42 K proteins share common amino acid sequences. Both proteins are metabolically stable in nuclei and plasma membranes but unstable in the cytoplasm, as shown by pulse-chase experiments and cell fractionation studies. The 56 and 42 K proteins could be structurally related to SV40 T and U antigens in the nucleus of infected and/or transformed cells and to the SV40 tumor-specific transplantation antigen in the plasma membrane. (27 references)

5678 TEMPERATURE-SENSITIVE MUTANTS OF BALB/3T3 CELLS: DESCRIPTION OF A MUTANT AFFECTED IN CELLULAR AND POLYOMA VIRUS DNA SYNTHESIS. (Eng.)

Slater, M. L. (Worchester Foundation for Experimental Biology, Shrewsbury, MA 01545); Ozer, H. L. *Cell* 7(2): 289-295; 1976.

A temperature-sensitive DNA- mutant (ts-2) of the mouse cell Balb/3T3 was characterized. Studies with synchronized cells indicated that the defect is in DNA synthesis itself, rather than in progress toward its initiation. Ts-2 supported polyoma DNA synthesis after infection at 33 C but not at 38 C. Viral DNA synthesis begun at 33 C was inhibited upon shift to 38 C. Viral DNA synthesis could be used to distinguish different classes of cell DNA- mutants.

5679 POXVIRUS DNA. II. REPLICATION OF VACCINIA VIRUS DNA IN THE CYTOPLASM OF HELA CELLS.

(Eng.) Holowczak, J. A. (Dept. Microbiology, Coll. Medicine and Dentistry New Jersey, Rutgers Medical Sch., Piscataway, NJ 08854); Diamond, L. *Virology* 72(1): 134-146; 1976.

Virions of the WR strain of vaccinia, either containing genomes that lack cross-links and appear fragmented when analyzed in alkaline sucrose gradients or containing cross-linked genomes that sediment at approx 102S in alkaline sucrose gradients with no evidence of fragmentation, were found to be equally efficient in replicating their DNA in the cytoplasm of HeLa cells. The DNA replication was discontinuous; short pulses of [^{3}H]thymidine were incorporated into fragments that sedimented at about 20S in alkaline sucrose. As the pulse length increased, label was found in material that sedimented faster than 20S but more slowly than the strands of mature viral DNA. Molecules sedimenting at 30S-40S in alkaline sucrose accumulated with longer pulses. During a chase in cold medium, part of these molecules were converted to full-length molecules sedimenting at 72S-75S and into mature, cross-linked genomes sedimenting at 102S-106S in alkaline sucrose. Chromatography on benzoylated naphthoylated DEAE-cellulose (BND-cellulose) and hydroxyapatite columns demonstrated that replicating viral DNA had single-stranded regions, but such molecules could not be separated from mature genomes by sedimentation in CsCl gradients. No nascent strands of greater than unit length were detected, indicating that replication of the vaccinia genome probably does not involve continuous concatemers or the addition of new material to parental strands and that polymerization may be symmetrical. Evidence for a circular intermediate, with nicks in both strands, was obtained by the analysis of pulse and pulse-chase labeled replicating viral DNA molecules by centrifugation in neutral sucrose gradients. DNA species sedimenting 12%-15% more rapidly than parental genomes (at 82S-86S), appropriate for such a "nicked" circular intermediate, were found in which label accumulated during a chase before the appearance of mature genomes at 68S-72S. (65 references)

5680 ELIMINATION OF A PARAMYXO-TYPE VIRUS FROM ONCORNAVIRUS-PRODUCING HUMAN CELL LINES.

(Ger.) Niezabitowski, A. (Zentralinstitut fuer Krebsforschung der AdW der DDR, DDR - 115 Berlin-Buch, Lindenberger Weg 80, East Germany); Bender, E.; Micheel, B.; Rudolph, M.; Wunderlich, V.; Widmaier, R.; Papsdorf, G.; Sydow, G.; Uckert, W.; Bierwolf, D.; Graffi, A. *Arch Geschwulstforsch* 46(3) 187-196; 1976.

Two oncornavirus producing permanent human fibroblast (PHF) lines free from paramyxo-type viruses are described. The first line (PHF 3a) was establish by inoculation of permanent human Tu 197/Tr 1 cultures with serial dilutions of cell-free PHF-7 material containing both oncorna- and paramyxoviruses. At dilutions from 1:1,000 to 1:100,000, neither a cytopathic effect nor the presence of giant cells characteristic of paramyxo-type infection could be detecte In the second method, cell-free PHF-7 was again inoculated into Tu 197/Tr 1, but only after incubation with paramyxovirus antiserum; cell changes characteristic of paramyxo contamination followed. A second incubation with antisera yielded a paramyxovirus-free line, PHF-50. Direct treatment of PHF-7-infected Tu 197/Tr 1 with paramyxovirus antiserum was ineffective. PHF-39 and PHF-50 lines are morphologically similar, with round-oval epithelial-like cells containing one to three nucleoli, strongly contoured cytoplasm, and heavy mitotic activity. (20 references)

5681 HUMAN PAPILLOMA VIRUSES AND CANCER. (Eng.)

Zur Hausen, H. (Institut fuer Klinische Virologie der Universitaet Erlangen-Nuernberg, Loschgestrasse 7, D-852 Erlangen, West Germany); Gissmann L.; Steiner, W.; Dippold, W.; Dreger, I. *Bibl Haemat* (43): 569-571; 1976.

In spite of reports on the malignant growth of human papillomas and of observations that at least two animal papilloma viruses may induce these proliferations, the potential oncogenicity of these agents in humans has not been studied extensively. Typical papilloma particles have been seen often in human warts (verrucae vulgares), less frequently in condylomata acuminata, and only recently in laryngeal papillomas. An epidemiological survey is report that showed different age distributions in the incidence of verrucae vulgares, condylomata acuminata, and laryngeal warts. There was a striking bimodal age distribution of laryngeal warts, and among the 83 laryngeal papillomas in adults of this survey 19.3% became malignant. All cancer patients were male and generally heavy smokers. The epidemiologica pattern suggested strain differences among human papilloma viruses. This finding was confirmed by experiments on the restriction endonuclease cleavage pattern of wart viral DNA and by hybridization experiments with complementary RNA prepared from viral DNA isolated from a plantar wart. Further study of the relationship of this heterogeneous group of

ses to human cancer is recommended. (15 refer-
s)

DEMONSTRATION OF ADENOVIRUS ASSOCIATED
ENDONUCLEASE. (Eng.) Medveczky, P. (Inst.
obiology, Semmelweis Univ. Medical Sch., Hogyes
e u. 7-9, H-1092 Budapest, Hungary); Csuzi, S.;
, I.; Antoni, F. *Acta Microbiol Acad Sci Hung*
): 69-76; 1976.

ieoxyribonuclease (DNase) activity of cell
acts of HEp-2 and amnion cell cultures infected
type 1 adenovirus was measured on ^{32}P-labeled
erichia coli DNA substrate. Enzyme activity was
nstrated by the acid-soluble nucleotides released
the ^{32}P-DNA and by the decreased sedimentation
of labeled DNA. High DNase activity was measured
oth adenovirus-infected and in untreated HEp-2
extracts. Because their nuclease activity was
lower than that of HEp-2 cells, virus-associated
uclease activity was successfully demonstrated
ie amnion host cells. Purified type 1 adenoviri-
lecreased the sedimentation rate of ^{32}P-labeled
oli DNA. The phenomenon is explained by the
n-associated endonuclease activity. Trypsin-
ivated and anti-HEp-2 IgG failed to inhibit the
n nuclease. An association between endonuclease
rypsin-sensitive penton is assumed. (8 refer-
)

ADENOVIRUS PROTEIN MATURATION AT 42 C.
(Eng.) Warocquier, R. (Unite de Recherches
rologie no. 102 de l'INSERM, 2, Place de Verdun,
Lille Cedex, France); Boulanger, P. A. *J Gen*
30(2): 233-242; 1976.

ation of adenovirus type 2-infected cells at
produced an inhibition of assembly of virus
cles although all the major viral structural
eptides and virus-induced cellular polypeptides
ified were detected by electrophoretic analysis.
tive high salt-acid-urea extraction of low
ular wt polypeptides revealed the absence of
in-VII at 42 C whereas precursor polypetide
and core protein V were found. Pulse-chase and
rature shift experiments indicated that cleavage
VII into VII was a reversible thermosensitive
ss, requiring de novo protein synthesis after
-down to 37 C. Virus particles assembled at 37
er transfer from 42 to 37 C contained both
DNA and polypeptides pre-labeled during the
se phase at 42 C, including core protein VII.

SUSCEPTIBILITY OF TERATOCARCINOMA CELLS TO
ADENOVIRUS TYPE 2. (Eng.) Kelly, F. (Depar-
te de Biologie Moleculaire, Institut Pasteur,
e du Dr Roux, 75015 Paris, France); Boccara, M.
e 262(5567): 409-411; 1976.

usceptibility of differentiated teratocarcinoma
and primitive embryonal carcinoma cells to
virus type 2 (Ad2) polyoma virus, and Simian
40 (SV40) was studied. Two teratocarcinoma
lines, primitive PCC3 (clone A/1) and differentiated PCD3, derived from a transplantable mouse teratocarcinoma, were infected with Ad2 and screened for production of viral antigens and infectious viral particles by indirect immunofluorescence 20 hr and 36 hr after infection. HeLa cells were used as controls. Reagents were hamster anti-T antigen antiserum and rabbit multivalent capsid antiserum with normal nonimmune sera as control. Synthesis of adenovirus-specific T antigen and of late capsid proteins occurred in both PCC3 and PCD3. Both types produced infectious virus at a titer 50 to 100 times lower than HeLa cells. PCC3 were resistant to both polyoma virus and SV40; fewer than 1 to 10^4 cells were T-antigen and V-antigen positive after polyoma infection and no T-antigen positive cells were detected after SV40 infection. It is hypothesized that at least one cellular function required early in the lytic cycle of SV40 and polyoma, possibly recombination between host and viral genomes, is missing in PCC3. (11 references)

5685 ANALYSIS OF ADENOVIRUS TYPE 2 GENE FUNCTIONS BY CELL-FREE TRANSLATION OF VIRAL MESSENGER RNA. (Eng.) Westphal, H.; Eron, L.; Ferdinand, F.-J.; Callahan, R.; Lai, S.-P. *In: Tumor Viruses. Cold Spring Harbor Symposia on Quantitative Biology.* Cold Spring Harbor Lab. (Cold Spring Harbor, NY): vol. 39, pp. 575-579; 1975.

Cell-free translation of adenovirus type 2 (Ad2) viral messenger RNA (mRNA) was used to analyze Ad2 gene functions. Poly(A)-containing RNA similar to that extracted from polysomes of Ad2-infected cells was translated in a cell-free, protein-synthesizing system derived from Krebs II ascites mouse tumor cells. Sodium dodecyl sulfate (SDS)-polyacrylamide gel electrophoresis of the reaction products revealed hexon, penton base and fiber, IIIa and V polypeptides, and core protein VII, which appeared to be structurally identical to their in vivo counterparts. Viral RNA sequences contained in polysomal RNA extracts were selected by hybridization to viral DNA. Only one-half of the DNA complementary to poly(A)-containing polysomal RNA of infected cells annealed with Ad2 DNA. Preparative hybridization of the polysomal RNA with Ad2 DNA fully removed the contaminating host cell RNA. Pure Ad2 mRNA generated the same translation products in vitro as did the less pure preparation. The efficiency of cell-free translation appeared to be inversely proportional to the product size. Nine fractions of different size poly(A)-containing polysomal Ad2 mRNA were obtained by sucrose gradient centrifugation, and the cell-free products specified by each of the fractions were examined. RNA coding for hexon and penton base was found in the fast-sedimenting fractions, and the fiber, IIIa, and V polypeptides were specified by more slowly sedimenting RNA. The fast-sedimenting RNA appeared to have preferred homology with L strand and A fragment DNA, whereas RNA pools from the top of the gradient were relatively rich in H strand transcripts and displayed little homology with the A fragment. The sedimentation velocities of the individual species of polysomal Ad2 mRNA appeared to indicate that most RNA chains are long enough to encode more than one virion polypeptide. (21 references)

5686 VIRAL NUCLEIC ACID SEQUENCES IN TRANSFORMED CELLS. IV. A STUDY OF THE SEQUENCES OF ADENOVIRUS 5 DNA AND RNA IN FOUR LINES OF ADENOVIRUS 5-TRANSFORMED RODENT CELLS USING SPECIFIC FRAGMENTS OF THE VIRAL GENOME.

(Eng.) Flint, S. J. (Center Cancer Res., Massachusetts Inst. Technology, 77 Massachusetts Ave., Cambridge, MA 02139); Sambrook, J.; Williams, J. F.; Sharp, P. A. *Virology* 72(2): 456-470; 1976.

Specific fragments of adenovirus 5 (Ad 5) DNA were produced by digestion of intact, ^{32}P-labeled viral DNA with restriction endonucleases *Eco* Rl and *Hpa* 1. The kinetics of renaturation of each fragment and of complete Ad 5 DNA were measured in the presence of DNA from four lines of Ad 5-transformed rodent cells and from nontransformed control cells. The four lines contained sequences homologous to the *Hpa* 1 fragment comprising the left 4% of the viral genome, but varied in the other Ad 5 DNA sequences: three lines of transformed cells contained segments of DNA extending from the left hand end to points 35%, 40%, and 12% along the viral genome and carried no other Ad 5 DNA sequences. The fourth line also contained sequences homologous to the left half of the viral genome, but these could not be defined precisely. Therefore, the gene(s) encoded by the left end of Ad 5 DNA must specify any viral gene functions expressed in transformed cells. Separated strands of the three *Eco* Rl fragments and certain *Hpa* 1 fragments of ^{32}P-labeled Ad5 DNA were hybridized with unlabeled, cytoplasmic RNA extracted from each of the lines. In each case, about 10% only of the r strand sequences of the largest *Eco* Rl fragment were complementary to transformed cell RNA. These sequences were mapped to the left end of the viral genome using *Hpa* 1 fragment strands. The same sequences were expressed as mRNA during the early phase of an Ad 5 lytic infection. (31 references)

5687 ADENOVIRUS TYPE 12-SPECIFIC RNA SEQUENCES DURING PRODUCTIVE INFECTION OF KB CELLS.

(Eng.) Smiley, J. R. (Biology Dept., McMaster Univ., Hamilton, Ontario, Canada); Mak, S. *J Virol* 19(1): 36-42; 1976.

The complementary strands of adenovirus type 12 DNA were separated, and virus-specific RNA was analyzed by saturation hybridization in solution. During late infection whole cell RNA from human Ad12 and KB cells hybridized to 75% of the light (l) strand and 15% of the heavy (h) strand, while cytoplasmic RNA hybridized to 65% of the l strand and 15% of the h strand. Late nuclear RNA hybridized to about 90% of the l strand and at least 36% of the h strand. Double-stranded RNA was isolated from infected cells late after infection, which annealed to greater than 30% of each of the two complementary DNA strands. Early whole cell RNA hybridized to 45%-50% of the l strand and 15% of the h strand, whereas early cytoplasmic RNA hybridized to about 15% of each of the complementary strands. All early cytoplasmic sequences were present in the cytoplasm at late times. (27 references)

5688 EPIDEMIOLOGY OF LEUKEMIA AMONG BABOONS SUKHUMI MONKEY COLONY.

(Eng.) Lapin, B. (Inst. Experimental Pathology and Therapy, PB 66, Gora Trapetziya, Sukhumi, USSR). *Bibl Haematol (B sel)* (43): 212-215; 1976.

Cells from the hematopoietic organs of hamadryas baboons (Sukhumi monkey colony) with lymphoma contained a herpeslike virus, designated GVP, that i morphologically and immunologically similar to Ep Barr virus (EBV). These cells were studied by ind rect immunofluorescence for the presence of viral capsid antigen; they were found to contain antibo titers of 1:128-1:640. Sera of monkeys inoculated with blood from human leukemia patients, of leuke monkeys or those in close contact with inoculated animals, and of monkeys kept in isolation from th main colony were investigated. Antibodies to EBV GVP at titers from 1:128 to 1:1,024 were seen in sera of 60% of the baboons with lymphoma (or thos in close contact with them) and in 70% of monkeys inoculated with human leukemic blood. Only 1/28 monkeys living in isolation showed an antibody tit of 1:128. Other monkeys living in isolation had titers of 1:4 or 1:8 or none at all. C type oncor virus was seen in the blood plasma sediments of si animals after ultracentrifugation and in the 1.16-g/cm^3 band of sucrose and the 1.21-g/cm^3 band of cesium chloride density gradients. C virus was als found in ultrathin sections of the hematopoietic other organs of the same monkeys. Herpesvirus immunologically and morphologically similar to EBV, antibodies to this virus, and C oncornaviruses wer seen in the same animals. The role of this virus association is being studied. (6 references)

5689 THE EPSTEIN-BARR VIRUS AND MALIGNANCY: MOLECULAR EVIDENCE.

(Eng.) Pagano, J. S. *In: Tumor Viruses. Cold Spring Harbor Symposia on Quantitative Biology.* Cold Spring Harbor Laborator (Cold Spring Harbor, NY): vol. 39, pp. 797-805; 1975.

The occurrence of Epstein-Barr virus (EBV) DNA in Burkitt's lymphoma, nasopharyngeal carcinoma, and human lymphoblastoid cell lines is discussed. As shown by both cRNA-DNA hybridization and DNA-DNA renaturation kinetics, Burkitt's lymphoma patients from Kenya, but not those from America, generally contain detectable EBV DNA in their tumor tissues. The same techniques have revealed EBV DNA in malignant tissue from nasopharyngeal carcinoma patients in Kenya, Singapore, Taiwan, and Tunis. The viral nucleotide sequences detected in a Tunisian tumor specimen showed more than 95% homology with the pu viral DNA derived from a Kenyan tumor, but there w up to a 15% lack of homology in the two Singapore specimens examined. Lymphocytes established as cel lines in culture almost always contain EBV DNA provided they are of B-cell origin. These cell lines not necessarily shed virus or express viral antige although they contain EB nuclear antigen. B-cell lines derived from a patient with acute lymphocyti leukemia contained readily detectable EBV DNA, whi T-cell lines established from the same patient did not. It is hypothesized that the control of prolif-

:ion of the EBV-transformed B lymphocytes in vivo
ediated in part by a cytotoxic reaction produced
T-lymphocyte response that is evident and effec-
in infectious mononucleosis. There is also
rect evidence that human cytomegalovirus can
ct and perhaps transform human lymphocytes in
. (22 references)

HEPATITIS-B SURFACE ANTIGEN AND ANTIBODY IN BANTU PATIENTS WITH PRIMARY HEPATOCEL- R CANCER.

(Eng.) MacNab, G. M. (South African
. Medical Res., Dept. Medicine, Univ. Witwaters-
and Johannesburg Hosp., Johannesburg, South
ca); Urbanowicz, J. M.; Geddes, E. W.; Kew, M.
r *J Cancer* 33(5): 544-548; 1976.

prevalence of hepatitis B surface antigen
Ag) and antibody (Anti-HB) was studied in 158
hern African Bantu patients with primary hepato-
ular cancer. HbsAG was found in the serum of 58
4%) by counter immunoelectrophoresis and in 94
5%) by radioimmunoassay (RIA). The prevalence of
antigen in the general Bantu population using
e methods was 7% and 9%, respectively. Antibody
nst HBsAg was detected in 11.6% of the patients
assive hemagglutination (PH) and 13.4% by RIA
in 33.4% (by PH) of a control population. Anti-
subtypes were predominantly ''adw'' (69.2%),
a lesser frequency of ''ayw'' (23%), and 7.8%
indeterminate. The corresponding figures in the
rols were 80.4%, 8.4% and 11.2%. HBsAg was more
on in younger patients. No relationship could be
nstrated between hepatitis B antigenemia and the
ence of α-fetoprotein in high concentration,
ough there were far fewer patients in the α-feto-
ein-negative group. (32 references)

TRANSFORMATION OF HUMAN EMBRYONIC FIBRO- BLASTS BY PHOTODYNAMICALLY INACTIVATED S SIMPLEX VIRUS, TYPE 2 AT SUPRA-OPTIMAL TEM- URE.

(Eng.) Kucera, L. S. (Dept. Microbiology,
n Gray Sch. Medicine, Wake Forest Univ., Win-
-Salem, NC 27103); Gusdon, J. P. *J Gen Virol*
: 257-261; 1976.

embryo fibroblast cells were washed with 0.01
s-HCl buffered saline pH 7.0 and infected with
al red and light-inactivated Herpes Simplex
Type 2 (HSV-2) [about 90% inactivation of
e-forming units (PFU) at an input multiplicity
inactivated PFU of HSV-2/cell]. After 1 hr at
the cell monolayers were overlaid with 10 ml
owth medium. Cultures were incubated at 42 C to
partially inactivated HSV-2. After 8 days at
to block residual infectious virus multipli-
n, infected cultures were shifted down to 37 C.
ts showed that uninfected control cells did
urvive during incubation at 42 C. About 50%
e infected cells were floating in the culture
m; these cells were viable by trypan blue dye
sion tests. Morphological transformation, char-
ized by the formation of cell aggregates,
red 4 wk after HSV infection and subculture of
loating cells. Assays for infectious virus pro-
on in the transformed cells were all negative, but the presence of the viral genome in infected cells was demonstrated in immunofluorescence tests with antiserum against HSV-2 antigens. It is concluded that HSV-2 genomes persist in infected cells. Cells infected with light inactivated HSV-2 had these properties in common with virus transformed cells: formation of cell aggregates, HSV-2-specific antigens and colony formation in soft methyl cellulose medium. These data support the idea that photodynamically inactivated HSV-2 has potential oncogenic activity.

5692 DEMONSTRATION OF THE ONCOGENIC POTENTIAL OF HERPES SIMPLEX VIRUSES AND HUMAN CYTOMEGALOVIRUS.

(Eng.) Rapp, F.; Li, J. L. *In: Tumor Viruses. Cold Spring Harbor Symposia on Quantitative Biology.* Cold Spring Harbor Laboratory. (Cold Spring Harbor, NY): vol. 39, pp. 747-763; 1975.

The oncogenic potential of herpes simplex virus types 1 and 2 (HSV-1 and HSV-2) and human cytomegalovirus (CMV) was studied by transforming normal hamster embryo cells with viruses inactivated by UV irradiation or photodynamic action. Indirect immunofluorescence techniques revealed the presence of virus-specific antigenic markers in the cytoplasm or on the surface of the transformed cells. Inoculation of the transformed cell lines into newborn or weanling syngeneic hosts produced tumors from which tumor cell lines were derived. These tumor cells contained virus-specific antigens, and the sera from the tumor-bearing animals contained virus-neutralizing antibodies. Rejection or retardation of the primary tumor could not be induced by prior immunization of the hamsters with HSV-1 or HSV-2, and the number of metastases increased from 20% to 47% in animals immunized with HSV-1. Immunization of weanling hamsters with simian virus 40 (SV40) inhibited metastases of HSV-2-transformed cells. The HSV-transformed cells were resistant to superinfection, but only at a low multiplicity of infection. The virus-transformed cells appeared to contain an inhibitor of HSV that was distinct from interferon. Virus RNA sequences similar to HSV-1 and HSV-2 were transcribed in hamster cells transformed by HSV-2 and in human Hep-2 cells productively infected with HSV-2. CMV stimulated cellular DNA synthesis in human embryonic kidney cells pretreated with 5-iodo-2'-deoxyuridine, but not in unpretreated cells. Similar results in growing HEL and Vero cells suggested that infective virus is necessary for the stimulation of DNA synthesis. The data demonstrate the oncogenic potential of HSV and CMV. (151 references)

5693 QUANTITATION OF ANTIBODIES TO HERPES SIMPLEX VIRUS TYPES 1 AND 2 BY COMPLEMENT-DEPENDENT ANTIBODY LYSIS OF INFECTED CELLS.

(Eng.) McClung, H. (Dept. Pathology, McMaster Univ., Hamilton, Ontario L8S 4J9, Canada); Seth, P.; Rawls, W. E. *Am J Epidemiol* 104(2): 181-191; 1976.

The release of ^{51}Cr from cells infected with herpes simplex virus type 1 or type 2 by antibody and complement was used to quantitate antibodies to the viruses. With decreasing concentration of antibody, a typical dose-response curve was observed: a region of antibody excess in which dilution did not affect percentage of specific ^{51}Cr release, followed by a region in which a linear relation existed between dilution and percentage of specific ^{51}Cr release. Therefore, a quantitative expression of antibody titer was defined as that dilution of serum that yielded 50% specific ^{51}Cr release. The slopes of the linear portion of the dose-response curves were characteristic of the type of virus used to infect the cells and not the source of antiserum; thus, the slopes could be used to estimate antibody titers. The multiplicity of infection influenced the antibody titers; reproducible results were obtained when cultures were infected with 3-5 plaque-forming units per cell, and the antibody titers decreased when less virus was used. The antibody titers obtained by the ^{51}Cr release test were similar to those obtained by a microneutralization test. The ^{51}Cr release test was reproducible and useful in estimating the percentages of antibody activity attributable to antibodies to cross-reacting and type-specific antigens. (19 references)

5694 HERPESVIRUS-INDUCED AUTOANTIBODIES IN ANIMALS.

(Ger.) Wutzler, P. (Institut fuer Medizinische Mikrobiologie, Medizinische Akademie Erfurt, Nordhaeuser Strasse 74, DDR-50 Erfurt, East Germany); Faerber, I.; Sproessig, M.; Schweizer, H.; Thiel, K.-D.; Schneider, J. *Arch Virol* 51(1/2): 59-66; 1976.

An experimental model of immunization under autologous conditions to avoid antibody formation against isoantigens was examined. Testicular parenchyma cultures from young rabbits were seeded with herpes simplex virus (HSV) types 1 and 2, and cell-free viral extracts were administered ip or im to rabbits of the same strain. The immunized animals developed antibody titers of 1:500-1:2,000 against HSV-1 and 2. Hormonal antibodies were not found. Testicular response to immunization was marked, especially between the convoluted tubules; no other tissue was positive. Histologically, a homogeneous, eosinophilic material was identified in the same interstitial sites. A low-grade focal inflammation, with gradual degeneration of tubuli contorti cells and inhibition of spermiogenesis, was also found. (14 references)

5695 INFECTION OF UV-IRRADIATED XERODERMA PIGMENTOSUM FIBROBLASTS BY HERPES SIMPLEX VIRUS: STUDY OF CAPACITY AND WEIGLE REACTIVATION.

(Eng.) Lytle, C. D. (Bureau Radiological Health, Food and Drug Admin., Rockville, MD 20852); Hellman, K. B.; Bockstahler, L. E. *Mutat Res* 36(3): 257-264; 1976.

The capacity of monolayers of both normal human and xeroderma pigmentosum (XP) fibroblasts to support plaque formation by herpes simplex virus was decreased when the monolayers were UV-irradiated and infected with herpes simplex virus type 1. Fibroblasts of XP complementation groups A, B, and D were four to six times more sensitive to UV than either fibroblasts of XP complementation group C or fibroblasts from a normal individual. When the monolayers were irradiated 4 days prior to infection, the capacity of normal fibroblasts to support herpesvirus growth recovered, whereas the capacity of the XP strains decreased further compared to that measured when infection immediately followed irradiation. Concu rent experiments with UV-irradiated herpesvirus showed that the survival of this virus did not increase when infection by irradiated virus immediat followed irradiation of the monolayers. However, the monolayers were irradiated 4 days prior to inf tion, the survival of this virus increased by a factor of nearly 2. This Weigle reactivation (WR) occurred at lower fluences to the XP fibroblasts than to normal fibroblasts, suggesting that WR res from residual cellular DNA damage left after excis repair. (12 references)

5696 ETIOLOGY AND PREVENTION OF MALIGNANT LYM PHOMA IN NON-HUMAN PRIMATES.

(Eng.) Lauf R.; Steinke, H. *In: Molecular Base of Malignancy: New Clinical and Therapeutic Evidence.* Deutsch, E. Moser, K.; Rainer, H.; Stacher, A., eds. (Stuttgar Georg Thieme Publishers): pp. 270-273; 1976.

The etiology and vaccine prophylaxis of herpes virus-induced tumors in nonhuman primates were stu ied. The oncogenic herpes virus *H. saimiri* (HVS) w partially purified by ultracentrifugation, examine for its oncogenicity in cotton topped (CT) marmose monkeys, and its oncogenic agent reisolated from tumor tissue. A CT marmoset monkey inoculated with the isolated virus developed the same tumor as the originally infected animal. HVS tumor tissue from the second animal gave no evidence of oncornavirus A killed vaccine was prepared by inactivation of H with heat (56 C for 4 hr) and formaldehyde (100 ng/ml for 6 days). Four to six im inoculations wit 0.5 to 1.0 ml of vaccine were given to 54 monkeys within 4 to 10 wk; 22 of the monkeys were later challenged with cell-free HVS by im inoculation. A vaccinated monkeys survived without disease, while nonvaccinated monkeys died of malignant lymphoma within 34 to 56 days. The experiments demonstrate the efficacy of a killed vaccine in preventing a malignant tumor in nonhuman primates and open the way for similar experiments with Epstein-Barr viru (19 references)

5697 INDUCTION OF HERPESVIRUS SAIMIRI LYMPHOM IN NEW ZEALAND WHITE RABBITS INOCULATED INTRAVENOUSLY.

(Eng.) Daniel, M. D.; Hunt, R. D.; Dubose, D.; Silva, D.; Melendez, L. V. *In: Oncogenesis and Herpesviruses II. Part 2: Epidemiology, Host Response and Control. Proceedings of a Sympos Held in Nuremburg, West Germany, 14-16 October 197* International Agency for Res. on Cancer. (Lyon, France): pp. 205-208; 1975.

A single dose, and in some cases, a double dose (titer $10^{6.5}$/ml; dosage range 0.5-2.0 ml depending on age) of herpesvirus saimiri (HSV) was injected into adult and weaned New Zealand White rabbits and by the intracardiac route into baby rabbits, result ing in almost 100% infection. Within 17-84 days, th adults died of rapidly progressing malignant lym-

Weaned and baby rabbits also developed leu-
similar to lymphoma in monkeys. No viron was
able in the tissues, but it could be recovered
appropriate techniques except from kidney
es. This was the first virus to induce neoplas-
sease in these animals and, based on the sim-
y of the disease to that in monkeys, it is
ted that these rabbits could be used in future
s.

TRANSFER OF tRNAS TO SOMATIC CELLS MEDIATED
BY SENDAI-VIRUS-INDUCED FUSION. (Eng.)
t, K. (Div. Biostructural Chemistry, Inst.
try, Univ. Aarhus, DK-8000 Aarhus C., Denmark);
n, J.; Engbaek, F.; Piper, P. W.; Celis, J. E.
atl Acad Sci USA 73(8): 2793-2797; 1976.

er RNAs (tRNA) from yeast (tRNAPhe and 4S
nd *Escherichia coli* (*suIII*+ tRNA_1Tyr) were
erred to mouse cells by a two-step transfer
ure. In the first stage of the transfer tRNAs
ncorporated into rabbit RBC; thereafter, the
RBC were fused with recipient mouse cells by
virus. At least 0.3%-0.4% of the total input
A used to load the RBCs could be transferred
se cells. Of the tRNA incorporated in the
cells, at least 50% could be recovered in the
f intact tRNA molecules when yeast 4S RNA was
With *E. coli suIII*+ tRNA_1Tyr, a rather smaller
tion of the tRNA remained intact (33%). Although
ading of tRNA into RBC is not essential for
take, the transfer was four times more effi-
with RBC as a vehicle for the injection. Sig-
ntly, a fraction (2%) of the recipient cells
sed much more incorporated tRNA than the average
hen Sendai virus and loaded RBC were used.
ells were not found in control experiments in
tRNA uptake was induced by Sendai virus alone.
ferences)

A POSSIBLE PHYSIOLOGICAL FUNCTION FOR TYPE
C RNA VIRUSES. (Eng.) Hellman, A. (NCI,
ethesda, MD 20014); Fowler, A. K.; Strickland,
Kouttab, N. M. *Bibl Haematol (Basel)* (43):
5; 1976.

RNA viruses have been observed in the repro-
e tissues of the mouse, rabbit, cat, baboon,
monkey, and man. Type C viral proteins are
predominantly in the uterine secretory epi-
m of the intact and gravid mouse uterus, as
s in uteri of exogenously hormone-stimulated
Electron microscopy showed C viral particles
g from secretory epithelial cells and mature
les in the immediate intercellular spaces in
eri of NIH Swiss mice. The particles appeared
revalent at 5 through 9 days of gestation. The
amount of p30 antigen doubled immediately
mating and remained elevated throughout most
tation, but markedly increased just prior to
ition. These findings indicate that C viral
ns are present in a broad spectrum of species
proper time and place necessary to participate
roduction. They are inducible to high levels
mones known to be elevated during this time
pear to react with the host's immunosurveil-
system. In view of the universality of C vi-
, as well as their reported interspecies genomic relationship, it is suggested that C viruses or their components function as determinants in the acceptance of the fetus as an allograft in mammalian pregnancy. (14 references)

5700 BIOCHEMICAL EVIDENCES FOR RIBONUCLEIC ACID VIRAL-LIKE CHARACTERISTICS IN MALIGNANT DISEASES OF GASTROINTESTINAL TRACT AND LUNG IN HUMANS. (Eng.) Cuatico, W. (Coll. Physicians and Surgeons, Columbia Univ., New York, NY); Cho, J.-R.; Cheung, C. H. *Surg Gynecol Obstet* 143(2): 193-200; 1976.

Malignant diseases of the gastrointestinal tract and lung in man possess three characteristics invariably found in RNA tumor viruses: a RNA-directed DNA polymerase, a high molecular wt RNA with a sedimentation coefficient of 70S, and particulate elements with densities of 1.16 to 1.18 g/ml sucrose gradient. Twelve of 17 carcinomas of the colon, 3 of 5 carcinomas of the stomach, 3 carcinomas of the rectum, and 7 of 10 carcinomas of the lung displayed detectable evidence of these viral-like entities. None of the corresponding normal tissues had positive reactions. (3 references)

5701 PHYTOHEMAGGLUTININ-INDUCED LEUKOCYTE BLASTOGENESIS IN NORMAL AND AVIAN LEUKOSIS VIRUS-INFECTED CHICKENS. (Eng.) Meyers, P. (Dept. Microbiology, Mayo Clinic and Mayo Medical Sch., Rochester, MN 55901); Ritts, G. E.; Johnson, D. R. *Cell Immunol* 27(1): 140-146; 1976.

5702 VIRAL SIZES, CONCENTRATIONS, AND ELECTROPHORETIC MOBILITIES BY THE NANOPAR ANALYZER (Meeting Abstract). (Eng.) DeBlois, R. W. (General Electric Res. Development Center, Schenectady, NY 12301); Wesley, R. K. *Biophys J* 16(21-part 2): 178a; 1976.

5703 POLYMORPHISM OF ENDOGENOUS MURINE TYPE-C VIRUSES GROWN IN TISSUE CULTURE: QUANTITATIVE IMMUNOELECTRON MICROSCOPY AND NEUTRALIZATION STUDIES (Meeting Abstract). (Eng.) Sarkar, N. H. (Sloan-Kettering Inst. for Cancer Res., New York, NY); Fox, M.; Eppley, S.; Pincus, T. *J Cell Biol* 67(2/Part 2): 383a; 1975.

5704 REPLICATION OF MURINE LEUKEMIA VIRUS IN CHINESE HAMSTER X MOUSE HYBRID CELLS: LACK OF ASSOCIATION WITH FV-1 LOCUS (Meeting Abstract). (Eng.) Marshall, T. H. (NIH, Bethesda, MD); Gazdar, A.; Minna, J. D. *J Cell Biol* 67(2/Part 2): 262a; 1975.

5705 A LEUKEMIA VIRUS STRUCTURE (Meeting Abstract). (Eng.) Basu, S. (Roswell Park Memorial Inst., Buffalo, NY 14263); Manly, K. F.; Parsons, D. F. *Biophys J* 16(21-part 2): 177a; 1976.

5706 IDENTIFICATION OF INFECTIOUS VIRIONS WHICH ARE VESICULAR STOMATITIS VIRUS PSEUDOTYPES OF MURINE TYPE C VIRUS. (Eng.) Livingston, D. M. (Div. Medical Oncology, Sidney Farber Cancer Center, Boston, MA); Howard, T.; Spence, C. *Virology* 70(2): 432-439; 1976.

5707 VIRUS-LIKE PARTICLES ISOLATED FROM RAT MAMMARY CARCINOMA. (Eng.) Hoelzel, F.; Pape, C.; Kopp, D.; Hirche, K.-P. *In: Molecular Base of Malignancy. New Clinical and Therapeutic Evidence.* Deutsch, E.; Moser, K.; Rainer, H.; Stacher, A., eds. (Stuttgart: Georg Thieme Publishers): pp. 216-221; 1976.

5708 COMPARISONS BETWEEN DIAMETERS MEASURED BY LASER BEAT FREQUENCY SPECTROSCOPY (LBFS) AND BY ELECTRON MICROSCOPY FOR MURINE MAMMARY TUMOR (MUMTV), ROUS SARCOMA (RSV), AND FELINE LEUKEMIA (FELV) VIRUSES (Meeting Abstract). (Eng.) Salmeen, I. (Res. Staff, Ford Motor Co., Dearborn, MI 48121); Rimai, L.; Luftig, R. B.; Liebes, L.; McCormick, J. J. *Biophys J* 16(21-part 2): 178a; 1976.

5709 DISTRIBUTION OF VIROGENIC 5-BROMODEOXYURIDINE IN RAT DNA AS DETERMINED BY SINGLE-STRAND SPECIFIC NUCLEASES (Meeting Abstract). (Eng.) Schwartz, S. A. (Dept. Pathology, Univ. Chicago, Chicago, IL). *J Cell Biol* 67(2/Part 2): 391a; 1975.

5710 ENDOGENOUS TYPE C VIRUS OF MOUSE RAG CELLS: VIRAL, IMMUNOLOGICAL, AND GENETIC CHARACTERISTICS (Meeting Abstract). (Eng.) O'Brien, S. J. (NCI, Bethesda, MD); Simonson, J. M.; Boone, C. W. *J Cell Biol* 67(2/Part 2): 313a; 1975.

5711 PATTERNS OF RNA SYNTHESIS IN EARLY MOUSE EMBRYOS (Meeting Abstract). (Eng.) Clegg, K. B. (VA Hosp., Supulveda, CA); Piko, L. *J Cell Biol* 67(2/Part 2): 72a; 1975.

5712 ACTINOMYCIN-D RESISTANCE AND VIRAL EXPRESSION IN L1210 CELLS (Meeting Abstract). (Eng.) Calvelli, T. A. (Sloan-Kettering Inst. for Cancer Res., New York, NY 10021); Hutchison, D. J.; de Harven, E. *J Cell Biol* 67(2/Part 2): 53a; 1975.

5713 MITOGEN-INDUCTION OF ENDOGENOUS C-TYPE VIRUSES (Meeting Abstract). (Eng.) Moroni, C. (Friedrich-Miescher-Institut, Postfach 273; Forschungs-Dept., Div. 4022 Basel, Switzerland); Schumann, G.; Teich, N. *Experientia* 32(6): 805; 1976.

5714 TUMORIGENICITY OF VIRUS-TRANSFORMED CELLS IN NUDE MICE (Meeting Abstract). (Eng.) Freedman, V. H. (Albert Einstein Coll. Medicine, Bronx, NY); Shin, S. I.; Risser, R.; Pollack, R. *J Cell Biol* 67(2/Part 2): 123a; 1975.

5715 TEMPERATURE-DEPENDENT MICROFILAMENT ALTERATIONS IN CELLS TRANSFORMED BY GROUP OF MUTANTS OF SV40 (Meeting Abstract). (Eng.) Vollet, J. J. (Baylor Coll. Medicine, Houston, TX); Brugge, J. S.; Butel, J. S. *J Cell Biol* 67(2/Part 2): 441a; 1975.

5716 COMPARATIVE STUDIES FOR THE CLASSIFICATI
OF THE HELA VIRUS: OCCURRENCE, FINE STRU
TURE AND IMMUNOELECTRON MICROSCOPY. (Eng.) Gelder-
blom, H. (Dept. Virology, Robert Koch-Inst., Nordu
20, D-1000 Berlin 65, West Germany). *Bibl Haematol*
(Basel) (43): 141-143; 1976.

5717 BIOCHEMICAL AND IMMUNOLOGICAL EVIDENCE F
ONCORNA VIRAL FEATURES IN HUMAN MELANOMA
GLIOBLASTOMA, AND LEUKEMIA. (Eng.) Birkmayer, G. D
Lubitz, W.; Hammer, C.; Eberhard, H.; Tichmann, I.
Chaussy, C.; Brandel, W. *In: Molecular Base of Mal*
nancy. New Clinical and Therapeutic Evidence. Deut
E.; Moser, K.; Rainer, H.; Stacher, A., eds. (Stut
gart: Georg Thieme Publishers): pp. 197-204; 1976.

5718 COMMON NUCLEIC ACID SEQUENCES IN MELANOM
OF DIFFERENT SPECIES SUGGEST PRESENCE OF
VIRUS IN HUMAN MELANOMA. (Eng.) Balda, B. R.; Hehl
mann, R.; Spiegelman, S. *In: Molecular Base of Mal*
nancy: New Clinical and Therapeutic Evidence. Deut
E.; Moser, K.; Rainer, H.; Stacher, A., eds. (Stut
gart: Georg Thieme Publishers): pp. 204-206; 1976.

5719 BIOLOGICAL CONDITIONS INFLUENCING THE
FOCAL NECROTIC HEPATITIS TEST FOR DIFFER
TIATION BETWEEN HERPES SIMPLEX VIRUS TYPES 1 AND 2
(Eng.) Mogensen, S. C. (Inst. Medical Microbiology
Univ. Aarhus, DK-8000 Aarhus C, Denmark). *Acta Pat*
Microbiol Scand [*B*] 84: 154-158; 1976.

5720 OLIGONUCLEOTIDE MAPPING OF PICORNAVIRUS
RNAS BY TWO-DIMENSIONAL ELECTROPHORESIS.
(Eng.) Frisby, D. P. (Searle Res. Lab., High Wycom
Buckinghamshire, England); Newton, C.; Carey, N.
Fellner, P.; Newman, J. F. E.; Harris, T. J. R.;
Brown, J. *Virology* 71(2): 379-388; 1976.

5722 HEPATITIS B SURFACE ANTIGEN (HBsAG) REAC
TIVITY IN CULTURE MEDIA FROM A HUMAN HE
TOMA CELL LINE (Meeting Abstract). (Eng.) Macnab,
(Dept. Serology, SAIMR, Johannesburg, South Afric
Alexander, J.; Urbanowicz, J.; Bey, E. *S Afr Med*
26(50): 1020; 1976.

See also:

* (Rev): 5402, 5406, 5425, 5432, 5433, 5434
5435, 5436, 5437, 5438, 5439, 5440
5441, 5443, 5452, 5457, 5491, 5503
5504, 5505, 5506, 5508, 5511, 5512
5513, 5514, 5515, 5516, 5517, 5518
5519, 5520, 5521, 5522, 5524, 5529
5536
* (Chem): 5566, 5614
* (Immun): 5733, 5739, 5742, 5747, 5748, 57
5750
* (Path): 5781, 5834
* (Epid-Biom): 5875, 5880, 5894

PURIFICATION OF SOLUBLE HUMAN MELANOMA-ASSOCIATED ANTIGENS.

(Eng.) Roth, J. A.
Oncology, Dept. Surgery, UCLA Medical Sch.,
0 CHS, Los Angeles, CA 90024); Slocum, H. K.;
grino, M. A.; Holmes, E. C.; Reisfeld, R. A.
r Res 36(7): 2360-2364; 1976.

oma-associated antigens were solubilized and
ied from fresh tumor specimens and the anti-
ity of these preparations was monitored by
ng for delayed cutaneous hypersensitivity reac-
(DCHR) in melanoma patients. Soluble extracts
lanoma metastases specimens from a single pa-
were prepared by 3 M KCl extraction. DCHR to
antigens were noted in 25 of 39 melanoma pa-
s and 7 of 30 patients with other neoplasms.
criterion for a positive DCHR was a 10-mm-
ter response 24 hr following injection.) Only 4
melanoma patients reacted to an extract of
ogous muscle. Maximum reactivity to these anti-
occurred at 24 hr and was demonstrated histolog-
y by skin biopsy. Chromatography on Sephadex
resulted in two fractions that elicited DCHR
lanoma patients. These fractions were subjected
lyacrylamide gel electrophoresis (PGE). The
region of the Sephadex I gel reacted in 8 of
lanoma patients and in only 1 of 7 patients
other neoplasms. Some activity was found in
regions of the gel. Skin test activity was
ned to the second PGE region of the Sephadex II
to which seven of nine melanoma patients reacted,
red with one of seven patients with other tumors.
ery of antigenic activity in excess of the
in the original extract after partial purifica-
indicated that inhibitors of DCHR in the crude
xtract were removed. A twentyfold increase in
enic activity per unit of protein was achieved.
esults tend to support the potential diagnostic
herapeutic usefulness of tumor-associated anti-
(22 references)

FURTHER EVIDENCE FOR DEREPRESSION OF H-2 AND IA-LIKE SPECIFICITIES OF FOREIGN HAPLO- IN MOUSE TUMOUR CELL LINES.

(Eng.) Garrido, F.
ue Immunology Unit, London Hosp. Medical Coll.,
St., London E1 2AD, England); Festenstein,
hirrmacher, V. *Nature* 261(5562): 705-707;

ling to the derepression hypothesis under
igation, allelic differences in histocompati-
antigens are the products of closely linked
most of which are repressed in normal circum-
es. A virus or other agent could interfere with
epression system and cause derepression of
n genes and/or repression of others, resulting
appearance of allogeneic and/or the loss of
eic specificities. The following tumor cells
ropagated in ascites form in syngeneic recipi-
(a) cells from a spontaneous θ-positive mouse
ma (SL2) expressing in addition to the H-2
icities of the host's cells, alloantigens (H-2
) apparently of foreign haplotypes; and (b) a
ally induced lymphosarcoma (Gardner) not ex-
ng any of the private H-2 specificities of the host's cells. They were taken from the peritoneal cavity and subjected to a direct complement-dependent microcytotoxicity test and a postlabeling assay that measures the uptake of ^{14}C-thymidine. SL2 lymphoma cells reacted strongly with all antisera against the private and public specificities of the host. Antiserum against the private H-2K specificity (H-2K.23) did not react with the Gardner lymphoma but did react with normal lymphocytes from the host, which indicates the loss of certain H-2 specificities. Ia specificities seemed to be expressed on one of the Thy 1.2 (alloantisera) positive tumors. The cytotoxic anti-tumor activity of anti-Ia sera could be absorbed with spleen cells from mice of foreign H-2 haplotypes, but not with spleen cells from H-2 identical mice or from serum donor strains. The data obtained support the derepression hypothesis, although the possibility of an activated endogenous virus directly creating new H-2-like determinants on the tumor cell surface cannot be excluded. The extra specificities were serologically indistinguishable from major histocompatibility complex (H-2 and Ia) specificities. (21 references)

5725 HETEROGENEITY OF THE PROTEIN MOIETY OF CARCINOEMBRYONIC ANTIGENS.

(Eng.) Wang, A.-C. (Dept. Basic and Clinical Immunology and Microbiology, Medical Univ. South Carolina, Charleston, SC); Banjo, C.; Fuks, A.; Shuster, J.; Gold, P. *Immunol Commun* 5(3): 205-210; 1976.

Amino acid sequence data were obtained for three different preparations of purified carcinoembryonic antigen (CEA) obtained from the hepatic metastases of individual colon cancer patients. The N-terminal amino acid sequences of the CEA preparations were determined with an automatic protein sequencer. The purities of the preparations were checked by radioimmunoassay and physicochemical procedures; there was no evidence of any molecules other than those with CEA tumor antigenic activity. Low overall yields of amino acid residues recovered after each cycle of degradation suggested the possibility that the polypeptide chains of some of the CEA molecules had a blocked N-terminus. Alternatively, the low yields may have reflected difficulties associated with the automated Edman degradation of molecules rich in carbohydrates. The protein moiety of CEA was heterogeneous, not only within a given preparation but also among different preparations, suggesting that the protein moieties of CEA molecules isolated from individual tumor patients may be coded for by several different (but similar) genes and that different sets of these genes may be expressed in various tumor patients. (11 references)

5726 THE CYTOCHEMICAL DEMONSTRATION OF INTRACELLULAR IMMUNOGLOBULIN: IN NEOPLASMS OF LYMPHORETICULAR TISSUE.

(Eng.) Garvin, A. J. (Medical Univ. South Carolina, 80 Barre St., Charleston, SC 29401); Spicer, S. S.; McKeever, P. E. *Am J Pathol* 82(3): 457-478; 1976.

An immunoglobulin-enzyme bridge technique was utilized for the selective localization of immunoglobulin-producing cells in spleen, lymph nodes, and lymphoreticular tumors lightly fixed for optimal immunocytochemistry or processed routinely for surgical diagnosis. Immunostaining for immunoglobulin was encountered consistently in the specially fixed tissues and was observed in some of the surgical specimens in areas. Many of the tumor cells in histiocytic lymphoma (reticulum cell sarcoma) of spleen and brain stained for IgG, but none evidenced reactivity for IgM or IgA. In Hodgkin's tumors, the prevalence of IgG-reactive stromal immunocytes in or between tumor areas was greatest in the nodular sclerosing form of the disease, abundant in mixed cellular, and least in lymphocyte-predominant and lymphocyte-depleted types. Immunocytes showing reactivity for IgG greatly exceeded those staining for IgM or IgA. Hodgkin's tumor cells immunostained frequently for IgG, infrequently for IgM, not at all for IgA, and in one instance, stained for κ but not for λ light chains. Individual tumor cells failed to stain for more than one type of Ig or light chain. The proportion of Ig reactive vs unstained tumor cells correlated with the prevalence of immunocytes in the different Hodgkin's categories. Reed-Sternberg cells differed in their fine structure in ways that possibly corresponded with the presence or absence of Ig shown at the light microscope level. Tumor cells in Hodgkin's disease and reticulum cell sarcoma also disclosed argyrophilia and, with a Schiff-methylene blue procedure, strong staining indicative of high concentrations of cytoplasmic RNA.

5727 EXPRESSION OF IMMUNOGLOBULIN SYNTHESIS IN HUMAN MYELOMA X NON-LYMPHOID CELL HETEROKARYONS: EVIDENCE FOR NEGATIVE CONTROL.

(Eng.) Zeuthen, J. (Inst. Human Genetics, Univ. Aarhus, DK-8000 Aarhus C, Denmark); Stenman, S.; Fabricius, H.-A.; Nilsson, K. *Cell Differ* 4(6): 369-383; 1976.

In all heterokaryons formed between human myeloma cells and various types of mouse and human nonlymphoid cells, the loss of the cytoplasmic content of lambda light chains (a component of IgE produced by the myeloma parent) was observed. This loss implies that the factors responsible are not specific for a species. The kinetics of the loss of immunoglobulin content was essentially identical in the different experiments, since all myeloma X nonlymphoid cell heterokaryons were scored as negative after immunofluorescence staining for λ light chains 4-6 hr after fusion. Myeloma cells treated with inhibitors of protein synthesis (puromycin and cycloheximide) also lost their cytoplasmic content of immunoglobulin after 4 hr. The fusion of myeloma cells with nonlymphoid cells apparently results in an immediate inhibition of immunoglobulin synthesis.

5728 THE DISTRIBUTION OF B AND T LYMPHOCYTES IN THE PERIPHERAL BLOOD OF PATIENTS WITH HODGKIN'S DISEASE.

(Eng.) Many, A. (Chaim Sheba Medical Center, Tel-Hashomer, Israel); Biniaminov, M.; Rosenthal, E.; Aghai, E.; Ramot, B. *Acta Haematol (Basel)* 56(1): 1-6; 1976.

This study presents the number of T and B cells in the peripheral blood of 74 patients with Hodgkin's disease at different stages of the disease, treate and untreated. The numbers of B cells found were increased in all cases over those found in control The numbers of T cells were significantly decrease in all cases over those found in controls. This decrease correlated with the stage of the disease-- the more advanced stages having fewer T cells than the others. Radiation treatment increased the numb of T cells somewhat. It is not clear whether the depletion in T cells is really quantitative or is matter of functionally impaired T cells. These dat support the hypothesis that Hodgkin's disease evol as a response of competent T cells to virus-infect T cells, which then leads to the development of neoplastic reticulum cells. (20 references)

5729 THE BLOCKING EFFECT OF CONDITIONED MEDIA FROM TUMOUR CELL CULTURES ON THE LYSIS O TARGET CELLS BY IMMUNE LYMPHOCYTES AND MACROPHAGES.

(Eng.) Lavrovsky, V. A. (Inst. Cytology and Geneti Siberian Branch Acad. Sciences USSR, Novosibirsk, USSR); Tikhonov, V. J.; Rubzov, N. B.; Razvorotnev V. A. *Folia Biol [Prague]* 22(2): 101-107; 1976.

The possibility that tumor cells may suppress a host's immunological defense system was investigat Three nontumor and eight tumor cell cultures were used; the latter were determined from spontaneous mammary tumors C3H/He, DD, and A/He mice and from human bladder carcinoma. Male CC57Br mice, 2-3 mo old, were immunized by sc injections of 1.5×10^7 C3H/He spleen cells into each foot. Target L cells (transformed C3H fibroblasts) were treated with regional lymph node lymphocytes and peritoneal mac phages of immune and nonimmune mice. Conditioned media from the murine and human tumor cell culture blocked the lysis of L cells by immune lymphocytes while conditioned media from nontumor cell culture did not inhibit and even enhanced the reaction. In similar experiments using C3Hf embryonic fibrobla as target cells, media from tumor cells inhibited lysis, and media from embryonic fibroblasts and L cells either did not affect the reaction or promot it. To determine the effect of conditioned media o other types of killer cells, experiments were performed with peritoneal exudate cells (95% macrophages) produced by ip injections of starch. Lysis of target cells by the immune exudate cells was al suppressed by conditioned media from tumor cells, but those from L cells enhanced the reaction. In these experiments, the blocking of the cytolytic reaction was nonspecific and the inhibitory capaci was not lost by diluted media. It is suggested tha tumor cells release substances capable of suppress the host's immunological defense system and influencing the immune attack to which they are subject (18 references)

5730 STUDIES ON CYCLIC AMP IN NORMAL AND PHA-TREATED LYMPHOCYTES AND IN LEUKEMIC CELL

(Eng.) Schwarzmeier, J. D.; Honetz, N.; Neumann, E. Mittermayer, K. *In: Molecular Base of Malignancy: New Clinical and Therapeutic Evidence.* Deutsch, E.; Moser, K.; Rainer, H.; Stacher, A., eds. (Stuttgar

ossible role of cyclic AMP (cAMP) in lymphocyte
sformation was investigated, especially the
ept of cAMP as a second messenger and mediator
ormonal actions. The plant protein phytohemagglu-
n (PHA) was used in this study, as it is thought
ave a hormonelike effect. Variable doses (50 and
ug protein/ml) of PHA were added to human periph-
lymphocytes incubated in autologous plasma at
and cellular cAMP concentrations were measured
ne Gilman test. The lower dose elicited virtually
nange in cAMP concentration in the first few
s; the larger dose resulted in a very rapid and
ed rise that peaked at 60 min and then gradually
eased to levels below the original. This suggests
cAMP does not play an essential role in initiat-
the mitogen-induced transformation of lympho-
s, but that a reduction of cAMP concentration is
ntial for the subsequent entry of cells into the
tic phase. Concentrations of cAMP in cells from
atients with chronic lymphocytic leukemia (CLL),
nic myeloid leukemia, and acute leukemia were
r than those in normal lymphocytes and granulo-
s. However, abnormally high levels were found in
patients, which correlated with their resistance
ytostatic therapy. Sodium fluoride and theophyl-
noticeably increased cAMP levels in both normal
leukemic cells. DNA synthesis (or thymidine
ke of stimulated and nonstimulated lymphocytes
leukemic cells) was inhibited in almost all cell
s examined by dibutyryl cAMP (db-cAMP), sodium
ride and theophylline; only in CLL cases did
AMP stimulate rather than inhibit thymidine
ke. It was concluded that the inhibitory effect
odium fluoride and theophylline was not mediated
ne increased cAMP concentrations and that re-
se of leukemia cells, normal cells, and PHA-
ted control lymphocytes to exogenous cAMP dif-
d widely. (11 references)

ELECTRON MICROSCOPIC AND IMMUNOHISTOCHEMICAL
STUDIES OF HUMAN LYMPHOCYTES. (Ger.) Huhn,
. Medizinische Klinik der Universitaet Muenchen,
ssenstrasse 1, D-8000 Munich 2, West Germany);
H.; Thiel, E.; Fink, U.; Ruppelt, W. *Blut*
: 87-102; 1976.

ntitative-morphological study of healthy and
ic lymphocytic leukemic (CLL) lymphocytes is
nted. B lymphocytes were labeled directly by
ologous, peroxidase-conjugated anti-human Ig
t globulin; T lymphocytes were preincubated
anti-T cell rabbit globulin and then labeled
cubation with peroxidase-conjugated anti-IgG
t globulin from sheep. Spontaneous T cell
te formation with neuraminidase-treated sheep
as also studied. In healthy subject, the aver-
and T cell levels were 24% and 80%, respectively.
L patients, 65% of the lymphocytes were B type
, 13% T type. Electron microscopy showed a sig-
antly higher cytosome content in T_1 than B_1 cells
he reverse for rough endoplasmic reticula. The
hondrial distribution was about equal. Each
type had two subtypes: a small undifferentiated
and a larger, organelle-rich cell. The larger B
pe was rich in mitochondria and ergastoplasm;
larger T subtype was rich in lysosomes and cytosomes. The smaller subtypes scarcely allowed morphological distinction. Rosette-forming cells corresponded structurally to T cells. (46 references)

5732 SUPPRESSION OF ANTITUMOR LYMPHOCYTE MEDIATED CYTOTOXICITY BY HUMAN CHORIONIC GONADOTROPINS. (Eng.) Lange, P. H. (Dept. Urologic Surgery, Univ. Minnesota, Minneapolis, MN 55455); Hakala, T. R.; Fraley, E. E. *J Urol* 115(1): 95-98; 1976.

The effect of human chorionic gonadotropin on the in vitro cytotoxicity of lymphocytes against human transitional cell carcinoma cells was studied in nine patients using the microcytotoxicity assay. Lymphocytes from six patients were cytotoxic against transitional cell carcinoma cells. However, in the presence of human chorionic gonadotropin the cytotoxicity of these lymphocytes against transitional carcinoma cells was diminished. Human chorionic gonadotropin alone or in combination with non-cytotoxic lymphocytes did not change the growth of target cells and human chorionic gonadotropin did not have a direct toxic effect on lymphocytes alone. These results demonstrate that human chorionic gonadotropin can inhibit the cytotoxic action of lymphocytes against human tumor cells in vitro. Human chorionic gonadotropin may contribute to the poor prognosis associated with certain human chorionic gonadotropin-secreting human tumors.

5733 CELLULAR IMMUNITY IN RATS WITH PRIMARY BRAIN TUMORS: INHIBITION OF MACROPHAGE MIGRATION BY SOLUBLE EXTRACTS OF AVIAN SARCOMA VIRUS-INDUCED TUMORS. (Eng.) Adams, D. O. (Duke Univ. Medical Center, Durham, NC 27710); Gilbert, R. W.; Bigner, D. D. *J Natl Cancer Inst* 56(6): 1119-1123; 1976.

Rats bearing primary brain tumors induced by avian sarcoma virus (ASV) were studied by the migration-inhibition factor (MIF) assay for the presence of cell-mediated immunity to tumor-associated antigens. Astrocytomas and sarcomas of the brain were induced in 34 neonatal F344 rats by the ic inoculation of Bratislava-77 ASV. At weekly intervals from 4 to 9 wk after inoculation, peritoneal exudate cells (PEC) from tumor-bearing rats were tested in an MIF assay against soluble and KCl-treated extracts of a syngeneic, ASV-induced sarcoma. Incubation of the PEC with a soluble extract of syngeneic liver or with a KCI extract of a syngeneic, chemically induced tumor served as controls. Of 14 rats tested against the soluble tumor extract, 6 (43%) had statistically significant inhibition of migration. Of 23 animals tested against the KCl extract, 16 (70%) had significant inhibition. Immunity to the KCl extract was significant in most rats at each period. Ten rats were tested against a KCl extract of a hamster ASV-induced tumor; seven had significant inhibition of migration. None of three tested against a soluble extract of a syngeneic, chemically induced tumor had significant inhibition. Rats bearing ASV-induced brain tumors displayed cell-mediated immunity to tumor-associated antigen or antigens of ASV-induced tumors, which could be solubilized. The immunity is ascribed to the presence of the brain tumors, since immunity was equally present in animals bearing brain tumors plus microscopic sarcomas at the inoculation site or in animals bearing brain tumors alone. (32 references)

5734 CELLULAR IMMUNITY IN MALIGNANT MELANOMA. (Ger.) Fritz, J. (Univ.-Klinik fuer Dermatol. und Venerol., Medizinische Univ.-Klinik, Auenbruggerplatz 8, A-8036 Graz, Austria); Grond, K.; Tilz, G. P. *Arch Dermatol Forsch* 255(2): 203-209; 1976.

A direct leukocyte migration inhibition assay was performed in 9 males (35-72 yr) and 11 females (34-71 yr) who had malignant melanomas at different clinical stages. The results were compared with assay results in 20 adult controls and 12 patients with assorted cutaneous and extracutaneous tumors. Homologous melanoma extracts from three other patients were used as antigens. Eight of nine patients receiving extract A showed a significant inhibition of migration. With extract B, 5/5 patients responded to the antigen but only 2/6 showed migration inhibition with extract C. No significant correlation could be established between clinical stage of malignancy and cell response to antigen. Two patients with leukoderma acquisitum centrifugum showed no migration inhibition with extracts A or B at 1:5 and 1:50 dilutions. No inhibition was found in any patient at 1:50 dilutions of extracts A or C; in one patient with mycosis fungoides I and another with chronic lymphocytic leukemia, migration was significantly stimulated by extract A (1:50). (28 references)

5735 INHIBITION OF CELL-MEDIATED CYTOTOXICITY TO CHEMICALLY INDUCED RAT TUMORS BY SOLUBLE TUMOUR AND EMBRYO CELL EXTRACTS. (Eng.) Zoeller, M. (Deutsches Krebsforschungszentrum Heidelberg, Institut fuer Nuklearmedizin, 6900 Heidelberg, West Germany); Price, M. R.; Baldwin, R. W. *Int J Cancer* 17(1): 129-137; 1976.

When lymph node and spleen cells from rats bearing or immunized against aminoazo dye-induced rat hepatomas or 3-methylcholanthrene-induced rat sarcomas were pretreated with 3 M KCl extracts of these tumors, their cytotoxicity for cultured cells from the corresponding tumor was specifically inhibited. In cross-test combinations of target tumor and tumor-bearer effector-cell donor, tumor extracts only inhibited cytotoxic responses when they were derived from the tumor homologous to the target cell and not when the extract was from the tumor borne by the effector-cell donor. One component of the tumor-bearer cytotoxic response was directed against tumor-associated embryonic antigens, since soluble extracts of embryos or tumor extracts containing embryonic antigens inhibited the tumor-bearer cell-mediated cytotoxicity in both specific and cross-test combinations of target tumor and effector cells. The findings are discussed in relation to tumor antigen expression and the immune responses that these antigens may evoke in tumor-bearing rats. (23 references)

5736 DEFECTIVE CELL-MEDIATED IMMUNITY IN CARCINOMA OF THE PROSTATE. (Eng.) Thomas, J W. (Dept. Medicine, Section Allergy, Univ. Tenness Center for the Health Sciences, Memphis TN 38165); Jerkins, G.; Cox, C.; Lieberman, P. *Invest Urol* 14(1): 72-75; 1976.

Cell-mediated immunity was assayed in 18 patients with a histologic diagnosis of carcinoma of the prostate and in 10 control patients with benign prostatic hypertrophy. In vivo cell-mediated respo was assayed by intradermal skin testing to a batte of five delayed hypersensitivity antigens. In vitr cell-mediated immunity was studied by lymphocyte transformation with both heterologous and autologo sera and nonimmune rosette formation. Both specifi antigens (Dermatophyton and streptokinase-streptod nase) and a nonspecific mitogen (phytohemagglutini were used for lymphocyte transformation studies. Nonimmune rosette formation was performed under numerous temperature ranges. A defect in cell-medi ated immunity was found in patients with carcinoma of the prostate. Skin tests demonstrated a signifi cantly increased incidence of anergy in cancer patients. Mitogen-induced lymphocyte transformation was depressed significantly when autologous serum from patients with prostatic carcinoma was utilize It is concluded that a defect in cell-mediated immunity does exist in patients with prostatic carci noma. This defect is expressed in vivo and in vitr and seems to be mediated by a serum factor. (29 references)

5737 TUMOUR ASSOCIATED IMMUNITY AND IMMUNOCO PETENCE IN OVARIAN CANCER. (Eng.) Levin L. (Williamson Lab., Medical Coll. St. Bartholome Hosp., London EC1A 7BE, England); McHardy, J. E.; Poulton, T. A.; Curling, O. M.; Hudson, C. N. *Br Obstet Gynaecol* 83(5): 393-399; 1976.

The in vivo cell-mediated immune response to an autologous tumor extract was studied. Cell-free extracts of autologous ovarian cancer cells evoke delayed hypersensitivity response (DHR) in the sk in four out of six patients in remission from com epithelial (mullerian) malignant ovarian tumors a in none of seven patients in relapse. The minimum effective dose for DHR was 0.25 mg in three patie and 0.5 mg in the fourth; the diameter of the pos tive responses was 4 to 7 mm. These results appea to be consistent with in vitro blastogenic assay using the same autologous extracts. To assess whe diminished tumor-associated immunity was due to impaired cell-mediated immunocompetence, blastoge responses to purified protein derivative of tuber culin (PPD), a secondary recall antigen, and phyt hemagglutinin (PHA) were assessed. In the relapse group of patients, impaired responses to PHA were seen, but not to PPD, indicating that diminished tumor-associated immunity in relapse cannot be attributed to impaired cell-mediated immunocompeten to recall antigens. (19 references)

5738 CELL INTERACTION IN TUMOR ALLOGRAFT IMMUNITY. SUPPRESSOR CELL IN THE SPLEEN O

ENEIC TUMOR-SENSITIZED MICE. (Eng.) Argyris, B.
ept. Microbiology, State Univ. New York, Up-
Medical Center, Syracuse, NY 13210); Horowitz,
nsplantation 22(2): 112-121; 1976.

ytotoxic activity of lymphoid cells from allo-
tumor-sensitized mice (C57BL/6, DBA/2, and
e) was tested at various intervals after ip
tization. Peritoneal cells gave the highest
oxic index. The cytotoxic activity of the peri-
l cells was due to both peritoneal lymphocytes
eritoneal macrophages. Splenic macrophages, on
ther hand, exerted an inhibitor effect, as
nced by the increased cytotoxic activity of
n treated with antimacrophage serum (AMS).
ased cytotoxic activity was also found in: the
herent fraction of spleen after absorption on
; the effluent fraction of spleen after nylon
column filtration; and the medium density band
centrifugation of spleen on a discontinuous
e serum albumin gradient. The results suggest
resence of an AMS-sensitive, glass- and nylon
adherent spleen cell that could have a suppres-
ole in allogeneic tumor-sensitized mice. (43
ences)

NATURAL IMMUNITY IN THE ONCORNAVIRUS-
INFECTED MOUSE. (Eng.) Blair, P. B. (Dept.
eriology and Immunology, Univ. California, Ber-
, CA 94720). *Cancer Res* 36(2): 734-738; 1976.

ological protection against oncornavirus-
ed tumors was examined in BALB/cfC3H female
infected neonatally with mammary tumor virus
) and in BALB/c female mice supposedly free of
Immune responses were assayed by the ability of
en cells (with most of the macrophages removed)
t cytotoxically against target MTV-induced
ary tumor cells in a 2-day in vitro microcytotox-
y test and by the capacity of serum to block or
nce this activity. The neonatally MTV-infected
possessed spleen cells capable of significant
toxic activity against target MTV-induced mammary
cells in the microcytotoxicity assay. Spleen
s from the supposedly MTV-free mice also were
ifically active as a result of horizontal anti-
transmission. No quantitative differences existed
een the reactivity of mice not susceptible to
r development and those that may develop or have
ady developed tumors. There were, however, quali-
ve differences between those at risk and those
at risk. Because of these differences, this type
ssay may have prognostic potential. (18 refer-
s)

CYTOTOXICITY OF ANTISERA TO A MYELOGENOUS
LEUKEMIA CELL LINE WITH THE PHILADELPHIA
MOSOME. (Eng.) Whitson, M. E. (Univ. Tennessee
rial Res. Center, Center for Health Sciences,
ville, TN 37920); Lozzio, C. B.; Lozzio, B. B.;
, C. J.; Sonoda, T.; Avery, B. *J Natl Cancer*
56(5): 903-907; 1976.

specific antibody-dependent, complement-mediated
toxicity of a rabbit antiserum prepared against
ique line of myelogenous leukemia (ML) cells,
K-562, was determined. This line has the Philadelphia (Ph^1) chromosome and has been maintained in culture for nearly 5 yr with all the chromosomal and morphologic characteristics of the original cells isolated from a patient with chronic myelogenous leukemia (CML) in terminal blast crisis. The cytotoxicity was demonstrated by the trypan blue test and ^{51}Cr release assay for cultured ML cells, whereas no cytotoxicity was demonstrated for cells from B (SB) and T (MOLT 4) lymphoblastoid cell lines. The antisera showed no cross-reactivity for normal human peripheral leukocytes or purified granulocytes. A low level (<8%) of cytotoxicity was directed against cell membrane-associated fetal bovine serum proteins. Absorption of the immune serum with normal human bone marrow cells of first-trimester human whole embryo cells reduced the cytotoxic titer to a similar extent, suggesting the possibility of cross-reactivity between ML cells and fetal antigen(s). However, the ML antigen(s) was unrelated to carcinoembryonic antigen (CEA), since absorption with CEA had no effect on the serum cytotoxic titer. The anti-ML sera were cytotoxic for cells taken from 10 patients with CML and from 3 with acute myelogenous leukemia. In contrast, the leukocytes of one of four patients with acute lymphocytic leukemia and three of seven with chronic lymphocytic leukemia shared similar antigenic determinants as demonstrated by cytotoxicity tests. The significance of the cross-reactivity of some lymphatic and ML cells may be the result of the use of rabbit sera that did not distinguish antigens common to both granulocytic and lymphocytic cells, or it may reflect an immature or blastic antigen present on many leukemia cells. (24 references)

5741 EFFECTS OF ANAESTHESIA ON HOST RESISTANCE TO CANCER. (Eng.) Cooke, T. J. (Dept. Surgery, Royal Postgraduate Medical Sch. and Hammersmith Hosp., Du Cane Road, London, W12 OHS, England); Boak, J. L.; Stolier, A. J. *Bull Soc Int Chir* 34(5): 477-481; 1975.

Murine tumors were transplanted in 2-mo-old C3H/He and CBA/Ca female mice to test the effect of 1% halothane in air anesthesia on the host's immunological response. A highly antigenic methylcholanthrene-induced sarcoma (MC-Sa) syngeneic in the CBA strain, and a weakly antigenic mammary adenocarcinoma arising spontaneously in parous females of the C3H strain, were used. Two months after C3H females were given 2 x 10^5 viable mammary tumor cells sc and administered halothane anesthesia, palpable tumors appeared in 18/40 mice, but in only 4/30 controls. In the anesthetized group, there was also a reduced latent period before tumor appearance. CBA mice injected (sc) with 2 x 10^5 viable MC-Sa cells showed virtually 100% take in both control and anesthetized animals. The failure to demonstrate any effect from halothane in this group may be due to the high antigenicity of the MC-Sa tumor and the fact that threshold doses were exceeded. In another experiment, mice were given a preliminary thoracic x-irradiation of 1,000 rads over 6 min and tumor cell injections (5 x 10^5 mammary cells in C3H mice and 2 x 10^5 MC-Sa cells in CBA mice) via a lateral tail vein 24 hr after irradiation. There was no significant difference in the number of lung tumors in the control and anesthetized groups. The effect of halothane on macrophage activity was studied with the carbon clearance method in three groups of CBA mice. Depression of the phagocytic activity in the liver was significant only in the group that received 1% halothane for 1 hr on 7 consecutive days. The data show that halothane can increase the take of certain transplanted tumors and suggest that it can be an unfavorable influence in host-tumor relationships. (18 references)

5742 GRAFT-VERSUS-HOST REACTION: A PATHOGENETIC PRINCIPLE FOR THE DEVELOPMENT OF DRUG ALLERGY, AUTOIMMUNITY, AND MALIGNANT LYMPHOMA IN NON-CHIMERIC INDIVIDUALS. HYPOTHESIS. (Eng.) Gleichmann. E. (Abteilung fuer experimentelle Pathologie, Medizinische Hochschule Hannover, Karl-Wiechert-Allee 9, D-3000 Hannover, West Germany); Gleichmann, H. *Z Krebsforsch* 85(2): 91-109; 1976.

The graft-versus-host reaction (GVHR) is discussed in relation to the development of drug allergies, autoimmunity, and malignant lymphomas in nonchimeric individuals. It is proposed that the same diseases as those induced by the GVHR will arise in nonchimeric individuals if structures of the major histocompatibility complex (MHC) on lymphocytes are altered (by viral infection or by chemicals) in such a way that autologous T lymphocytes react against them as they react in the GVHR to semiallogeneic (F_1) lymphocytes that differ at the MHC. Diseases in which a GVHR-like pathogenesis is suspected are discussed. These include infectious mononucleosis, vaccinia (in mice), and hydantoin allergy. (113 references)

5743 MACROPHAGE ELECTROPHORETIC MOBILITY TEST (Letter to Editor). (Eng.) Field, E. J. (Multiple Sclerosis Res. Unit, Royal Victoria Infirmary, Newcastle upon Tyne NE1 4LP, England). *Lancet* 1(7969): 1125-1126; 1976.

The modified macrophage electrophoretic test (mod-MEM), the subject of a previous editorial, is suggested to be characterized by empty magnification rather than increased sensitivity. The finding that lymphocytes from patients with all forms of malignant disease showed sensitization to an encephalitogenic factor should be studied more thoroughly before conclusions are made about specific sensitization in malignant disease. The existence of a common antigen in all human cancers may provide for early treatment with immune therapy. The mod-MEM test may be useful in analyzing the antigenic structure in cancers, since it can detect single amino acid residue deletions or substitutions. The test could also be of value in studying workers at special risk of cancer, e.g., dye and rubber workers. (10 references)

5744 THE MACROPHAGE MEMBRANE POTENTIAL TEST: AN ELECTROPHYSIOLOGICAL MODIFICATION OF THE FIELD-CASPARY TEST IN MELANOMA PATIENTS. (Ger.) Redmann, K. (Institut fuer Physiologie, 30 Madgeburg, East Germany); Sochor, H. *Acta Biol Med Ger* 34(11/12): 1911-1914; 1975.

The sensitivity of the transmembrane potential an
electrophoretic migration of guinea pig macrophag
from peritoneal exudates to cell-free supernates
(lymphokines) in lymphocyte-antigen reactions was
applied to the differential diagnosis of malignan
skin tumors in 35 patients. Macrophage membrane
depolarization occurred in up to 41% of the melan
or melanosis circumscripta problastomatosa cases
Malignant nevi reduced the polarization 12%. Anti
alone, as in contact eczema, elicited only hyper-
polarization. BCG injection in malignant pigment
cell patients induced an initial hyperpolarizati
for several days, then a marked depolarization a
several weeks. Seven patients had no change in m
brane potential. The surface charge (mobility te
was 3%-12% lower in the malignant population tha
the controls. (17 references)

5745 ACTIVE SPECIFIC IMMUNOTHERAPY OF CANCE
EXPERIMENTAL ANIMALS. (Eng.) Simmons,
L.; Rios, A. *In: Host Defense Against Cancer and*
Potential. Proceedings of the 5th International
Symposium of The Princess Takamatsu Cancer Resea
Fund, Tokyo, 1975. Mizuno, D.; Chihara, G.; Fuku
F.; Yamamoto, T.; Yamamura, Y., eds. (Baltimore:
Univ. Park Press): pp. 227-244; 1975.

The immunoregression of transplantable and spont
ous mammary tumors in mice was studied to detern
whether it could be induced by challenge with *Vi*
cholerae neuraminidase (VCN)-treated tumor cells
Firmly established transplantable C3H/HeJ mammar
carcinomas were inhibited by host (C3H/HeJ and
FeJ mice) challenge with VCN-treated tumor cells
The effect was totally immunospecific; even VCN-
treated tumors bearing shared mammary tumor viru
(MTV) antigen could not induce the regression.
VCN was capable of increasing the immunogenicity
the private, unique-unshared tumor antigens on
mary carcinomas, but was incapable of increasing
immunogenicity of the shared MTV-associated tum
antigen even in syngeneic C3HeB/FeJ MTV-free mi
The immunoregressive effect of VCN-treated tumo
cells could be augmented by subtotal or total s
gical excision of large transplantable tumors.
taneous mammary tumors in retired breeder C3H/H
female mice were made to regress by repeated in
tumor injections of VCN and/or BCG and by total
excision and immunotherapy with VCN-treated aut
thonous mammary tumor cells. The use of VCN-tre
transplantable mammary tumor cells sharing the
associated antigen was not better than excision
alone. The evidence indicates that active speci
immunotherapy of spontaneous tumors with VCN-al
tumor cells may require the use of autochthonou
cells. (44 references)

5746 EFFERENT ENHANCEMENT OF A METHYLCHOLA
THRENE-INDUCED SARCOMA TRANSPLANTABLE
STRAIN 13 GUINEA PIGS. (Eng.) Berczi, I. (Dept.
Immunology, Faculty Medicine, Univ. Manitoba, W
nipeg, Manitoba R3E OW3, Canada); Tsay, H.-M.;
A. H. *Eur J Immunol* 6(6): 453-455; 1976.

The immunobiology of an antigenic methylcholan-
threne-induced sarcoma (MC-D) of inbred strain

inea pigs was investigated. The induction of con-
itant immunity by growing MC-D tumors was indi-
ted by the suppression of small tumor inocula in
e presence of a large tumor cell dose and by the
gression of intradermal tumor nodules. Furthermore,
is tumor was coated with antibody in vivo. It is
posed that antibody-mediated efferent enhancement
the major escape mechanism of this tumor. (43
ferences)

47 IMMUNE STATUS OF PATIENTS WITH HODGKIN'S
DISEASE: CORRELATION TO EPSTEIN-BARR VIRUS
3V) TITERS. (Ger.) Diehl, V. (Abt. Haematologie,
dizinische Hochschule, Karl-Wiechert-Allee 9, 3000
nnover-Kleefeld, West Germany); Hegge, K.; Kalden,
; Desselberger, U.; Krull, P. *Blut* 32(4): 279-284;
76.

attempt was made to correlate the course of Hodg-
n's disease with its prognosis by in vivo or in
tro assays. The relation between immunological
mpetence in Hodgkin's disease and serological
sponse to herpesvirus (especially Epstein-Barr
rus, EBV) is also explored. Groups of patients
bjected to skin tests with three secondary anti-
ns (Candida, trichophytin, and tuberculin) before
d during treatment were more frequently negative
an the control group ($p < 0.01 - p < 0.0005$). The
mber of circulating T lymphocytes was also lower,
d, during therapy only, the number of B lympho-
tes was higher ($p < 0.0005$). In the pretreatment and
eatment groups, 61% and 15% of the patients were
clinical stages I-IIIA. The absolute number of
ripheral lymphocytes was significantly lower, and
e percent of T lymphocytes normal, during complete
mission in the treatment group. The absolute T
mphocyte number, however, was half that of the
ntrol groups. Phytohemagglutinin failed to dis-
iminate between groups. Concanavalin A (Con A)
imulation was apparent in the pretreatment and
eatment groups but not in the controls. Con A was
e most sensitive indicator for detecting latent
munodeficiency in vitro. Elevated antibody titers
EBV capsid antigen occurred only if the number of
rculating T cells was below 30% and the skin test
action was negative or slight. Significant anti-
dy titers against EBV capsid antigen were measured
the pretreated, treated, and untreated patient
oups compared to controls. Titers against herpes-
ruses were in the control group range for all
tients, excluding herpes simplex in the remission
oup. (10 references)

'48 STUDIES OF THE IMMUNOLOGICAL BEHAVIOR OF A
STANDARDIZED, VIRUS-INDUCED RAT TUMOR
TER CRYOSURGICAL AND SURGICAL TREATMENT. (Ger.)
eschock, R. R. (Chirurgische Universitaetsklinik
esseldorf, BRD-4000 Duesseldorf, Moorenstrasse 5,
st Germany). *Z Exp Chir* 9(3): 186-190; 1976.

e relation between cryosurgical intervention and
st immunological competence is explored. Borstel
brosarcoma (TWR 268) homogenates were injected sc
45 Wistar rats. In one group (A) of 20 animals
e tumor was removed surgically after 2 wk; in a
cond group (B) of 20, the tumor was treated cryo-
genically. Five animals served as controls. Subsequent sc injections were made at different times and doses. In group A all tumors were completely resorbed, with no evidence of topical change at implantation site. There was conspicuous tumor regression in group B, with no tissue abnormality at the original tumor site. Group C animals either died or presented with extensive masses. Accordingly, an immunocryothermal response eliciting increased antigen and corresponding antibody failed to appear in cryonecrotic tissue. (37 references)

5749 IMMUNOLOGIC MECHANISMS IN THE PATHOGENESIS OF VIRUS-INDUCED MURINE LEUKEMIA. III. TARGET CELL SPECIFICITY OF AUTOREACTIVE THYMOCYTES. (Eng.) Proffitt, M. R. (Dept. Medicine, Massachusetts General Hosp., Boston, MA 02114); Hirsch, M. S., Ellis, D. A.; Gheridian, B.; Black, P. H. *J Immunol* 117(1): 11-15; 1976.

Studies were performed to investigate the role of viruses in the progression from autoimmunity to lymphoma. Evidence is presented suggesting that the autoreactivity of Moloney murine leukemia virus (MuLV-M) carriers is directed against antigens on syngeneic and allogeneic murine cells but not on xenogeneic cells. Thymocytes from preleukemic C3H/HeJ mice persistently infected with MuLV-M were vigorously autoaggressive toward normal syngeneic target cells; they exhibited a graded response to allogeneic cells, but they spared xenogeneic cells or syngeneic cells infected with MuLV-M or MuLV-G (Gross). Syngeneic target cells infected with nononcogenic lymphocytic choriomeningitis virus (LCMV) or transformed by the chemical carcinogen 3-methylcholanthrene were not similarly spared. This phenomenon, apparently induced by MuLV-M, is not associated with all persistent virus carrier states. Thymocytes from mice persistently infected with LCMV or with the lactic dehydrogenase virus (LDHV) failed to demonstrate an autoaggressive behavior. Transplantable lymphoma cells (derived from MuLV-M-carriers) were autoreactive in a pattern similar to thymocytes from preleukemic mice, which suggests a unique role for MuLV in the events leading from altered recognition of self to lymphoma. (19 references)

5750 RESTORATION OF LEUKEMIA VIRUS-SUPPRESSED IMMUNOCYTES IN VITRO BY PERITONEAL EXUDATE CELLS. (Eng.) Specter, S. (Dept. Microbiology, Albert Einstein Medical Center, Philadelphia, PA); Patel, N.; Friedman, H. *Proc Soc Exp Biol Med* 151(1): 163-167; 1976.

The effect of adding peritoneal exudate (PE) cells from normal BALB/c mice to Friend leukemia virus (FLV)-suppressed splenocyte cultures was studied. Splenocytes from FLV-infected mice failed to respond normally to SRBC when immunized in vitro in Marbrook chambers, compared with the responses of splenocytes from normal donor animals similarly immunized. The addition of PE cells, however, resulted in varying numbers of plaque-forming cells (PFC). Adding 10^3 or 10^4 PE cells did not alter the PFC response; however, adding 10^5 to 10^6 PE cells resulted in markedly higher PFC responses. The optimum response (with 3 x

10^5 cells) was similar to that observed in normal spleen cells. (The addition of PE cells to control cultures had little effect.) Optimum restoration of PFC formation occurred when the PE cells were added at the time of culture initiation. The addition of the cells 1 or 2 days after in vitro immunization had little or no effect. The addition of splenocytes or glass-adherent splenocytes (containing more macrophages) to the chambers had no restorative effect. These experiments indicate that in vitro immunosuppression of splenocytes from FLV-infected mice can be reversed readily by adding PE cell suspensions from normal donor mice. Restoration of the immune response was PE cell dose-dependent; a ratio of 1 PE cell per 10 splenocytes resulted in the largest numbers of PFC. Impaired antibody responsiveness by spleen cell cultures from FLV-infected mice may be due, in part, to effects on antigen-processing macrophages. (10 references)

5751 ALPHA-CHAIN DISEASE WITH LOCALIZED PLASMACYTOMA OF THE INTESTINE: IMMUNOPEROXIDASE STUDY. (Eng.) Skinner, J. M. (Dept. Pathology, Radcliffe Infirmary, Univ. Oxford, England); Manousos, O. N.; Economidou, J.; Nicolaou, A.; Merikas, G. *Clin Exp Immunol* 25(1): 112-116; 1976.

An ileocecal tumor in a patient with α-chain disease in remission was studied immunohistochemically. α-Chain disease is characterized by an abnormal protein with unique immunochemical characteristics that correspond to the heavy chain of IgA; it is secreted by the plasma cells infiltrating the gut and the mesenteric lymph nodes. The monoclonal character of the IgA fragment and the lack of light chains are consistent findings. The tumor in this patient was diagnosed to be a localized plasmacytoma. This patient was unique in that he did not show free α-chains in the serum. Several explanations are presented to account for this. The bowel distant to the tumor was normal histologically and had a normal pattern of Ig-producing cells. This observation indicates that the initial α-chain process of the patient was still in remission and that the development of the plasmacytoma represents a local growth from a different cell clone. (15 references)

5752 T AND B LYMPHOCYTES IN SKIN CHANGES OF CUTANEOUS LYMPHOMA. A CONTRIBUTION TO THE CLASSIFICATION OF LYMPHORETICULAR PROLIFERATIONS IN THE SKIN. (Ger.) Burg, G. (Dermatologische Klinik und Poliklinik, Universitaet Munchen, Frauenlobstr. 9, 8 Munich 2, West Germany); Braun-Falco, O. *Dtsch Med Wochenschr* 100(50): 2562-2564; 1975.

5753 A MICRORADIO-IMMUNOASSAY FOR CARCINO-EMBRYONIC ANTIGEN IN WHOLE SERUM AND TISSUES. (Eng.) Warner, N. L.; Khoo, S. K.; Macsween, J. M.; Bankhurst, A. D.; MacKay, I. R. *In: Host Environment Interactions in the Etiology of Cancer in Man. Proceedings of a Meeting Held at Primosten, Yugoslavia, 27 August-2 September, 1972.* World Health Organization, Internatl. Agency for Res. on Cancer. (Lyon, France); pp. 317-327; 1973.

5754 COMPARATIVE STUDY OF PRODUCTION OF LYM
BLASTOGENESIS INHIBITION FACTOR BETWEE
LEUKEMIC T AND BURKITT'S LYMPHOMA B LYMPHOID CEL
LINES. (Eng.) Han, T. (Roswell Park Memorial Ins
Buffalo, NY 14263); Pauly, J.; Minowada, J. *Bibl*
Haematol (Basel) (43): 409-411; 1976.

5755 TRANSITION FROM T CELL PROTECTIONS TO
CELL ENHANCEMENT DURING TUMOR GROWTH
ALLOGENEIC HOST. (Eng.) Manor, Y. (Dept. Medici
Meir Hosp., Kfar Saba, Israel); Treves, A. J.;
I. R.; Feldman, M. *Transplantation* 22(4): 360-3
1976.

5756 STUDIES OF THE MECHANISMS FOR THE IND
TION OF IN VIVO TUMOR IMMUNITY. I. IN
TION OF PRIMARY AND SECONDARY CELL-MEDIATED CYT
TOXIC RESPONSES BY ADOPTIVE TRANSFER OF LYMPHOC
(Eng.) Ting, C. C. (Lab. Cell Biology, NCI, NIH,
Bethesda, MD 20014). *Cell Immunol* 27(1): 71-81;
1976.

5757 TISSUE LYMPHOCYTE SUBPOPULATIONS, PRO
GLANDIN E AND CYCLIC NUCLEOTIDES IN H
MALIGNANT TUMORS (Meeting Abstract). (Eng.) Hus
G. (Dept. Medicine, Univ. New Mexico, Albuquerq
NM 87106); Hoagland, P. M.; Strickland, R. G.;
liams, R. C. *Clin Res* 24(3): 286A; 1976.

5758 CYCLIC NUCLEOTIDE LEVELS IN THE LYMPH
OF CARCINOMA PATIENTS (Meeting Abstra
(Eng.) Cheney, P. R. (Lab. Tumor and Biology Cl
ical Immunology, Winship Clinic Neoplastic
Diseases, Emory Univ. Medical Sch., Atlanta, GA
Kuo, J. F.; McLaren, J. R.; Wilkins, S. A.; Olk
A. L. *Radiat Res* 67(3): 545; 1976.

5759 RESPONSE OF REMISSION LYMPHOCYTES TO
THONOUS LEUKAEMIC MYELOBLASTS. (Eng.)
Taylor, G. M. (Univ. Dept. Medical Genetics, St
Mary's Hosp., Hathersage Road, Manchester, M13
England); Freeman, C. B.; Harris, R. *Br J Cance*
33(5): 501-511; 1976.

5760 THE EFFECT OF SPECIFIC ANTISERA ON TH
EXPRESSION OF MEMBRANE-ASSOCIATED ANT
OF SOMATIC HYBRIDS OF MURINE LEUKEMIA CELLS (Me
Abstract). (Eng.) Cohen, E. P. (La Rabida-Univ.
Chicago, Inst., Univ. Chicago, IL); Liang, W. *J*
Biol 67(2/Part 2): 74a; 1975.

5761 THE INTERACTION OF LEUKOCYTES AND THE
HYDROLASES WITH BACTERIA IN VITRO AND
VIVO: THE MODIFICATION OF THE BACTERICIDAL AND
TERIOLYTIC REACTIONS BY CATIONIC AND ANIONIC MA
MOLECULAR SUBSTANCES AND BY ANTI-INFLAMMATORY
(Eng.) Ginsburg, I. (Dept. Oral Biology, Facult
Dental Medicine, Hebrew Univ., Hadassah Medical
Center, Jerusalem, Israel); Lahav, M.; Ne'eman,
Duchan, Z.; Chanes, S.; Sela, M. N. *Agents Acti*
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2 IMMUNE RESPONSE TO GROSS VIRUS-INDUCED
LYMPHOMA. CRYOPRESERVATION OF FUNCTIONAL
IVITY OF RAT LYMPHOCYTES AND TUMOR CELLS. (Eng.)
aldo, J. R (Room 118, Building 8, Lab. Immunodiag-
is, NCI, Bethesda, MD 20014); Oldham, R. K.;
den, H. T.; Herberman, R. B. *Cell Immunol* 25(1):
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3 AN INHIBITOR OF MACROPHAGE CHEMOTAXIS
PRODUCED BY NEOPLASMS (Meeting Abstract).
g.) Snyderman, R. (Duke Univ. Medical Center,
ham, NC 27706); Pike, M. C. *Clin Res* 24(3): 336A;
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4 SOMATIC CELL HYBRIDS: GENETIC AND ANTIGENIC
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ada); Belehradek, J. ; Barski, G. *J Cell Biol*
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5 ANTIGENIC MODULATION AND THE REGULATION OF
CELL SURFACE ORGANIZATION (Meeting Ab-
act). (Eng.) Stackpole, C. W. (Memorial Sloan-
tering Cancer Center, Rye, NY); Jacobson, J. B;
uska, S.; Demsey, A. *J Cell Biol* 67(2/Part 2):
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66 SURFACE CHANGES ACCOMPANYING PRESENTATION
OF ANTIGEN-ANTIBODY COMPLEXES TO PERITONEAL
LLS (Meeting Abstract). (Eng.) Orenstein, J. M.
atl. Cancer Inst., Bethesda MD); Shelton, E. *J*
ll Biol 67(2/Part 2): 318a; 1975.

67 INTERACTION OF FC AND C3 RECEPTORS OF
LYMPHOID CELLS WITH ANTIBODIES AGAINST
DUCTS OF THE MAJOR HISTOCOMPATIBILITY COMPLEX:
SOCIATION OF MHC PRODUCTS WITH COMPLEMENT RECEP-
RS. (Eng.) Schirrmacher, V. (Dept. Cellular Immunol-
, Inst. Immunology and Genetics, Deutsches Krebs-
rschungszentrum, 69 Heidelberg, West Germany);
stenstein, H. *Transplant Rev* 30: 140-173; 1976.

68 HETEROTRANSPLANTATION OF HUMAN TUMORS INTO
THE CHEEK POUCH OF THE SYRIAN GOLDEN HAM-
ER: FURTHER STUDIES OF IMMUNOSUPPRESSION. (Eng.)
cobi, G. H.; Orestano, F. *In: Molecular Base of*
lignancy: New Clinical and Therapeutic Evidence.
utsch, E.; Moser, K; Rainer, H.; Stacher, A., eds.
tuttgart: Georg Thieme Publishers): pp. 128-136;
76.

69 THE IMMUNE STATUS OF SURGICAL AND IRRADI-
ATED CASES OF CERVICAL AND BREAST CANCER.
. COMPARISON OF IRRADIATED STAGE III CERVICAL
NCER CASES AND NONIRRADIATED, SURGICAL CASES.
er.) Palencia, C. (Institut fuer Immunologie, Borsch-
gasse 8a, A-1090 Vienna, Austria); Hernuss, P.;
Gitsch, E.; Weghaupt, K.; Wicke, L.; Kaercher, K. H.; Steffen, C. *Wien Klin Wochenschr (Suppl)* 87(24): 809-815; 1975.

5771 ALLOGENEIC TUMOR-SYNGENEIC MUSCLE SANDWICH GRAFTS: A METHOD FOR PROMOTING NONSPECIFIC GROWTH. (Eng.) Parks, R. C. (American Medical Center Denver, Denver, CO 80214). *J Natl Cancer Inst* 56(6): 1281-1284; 1976.

5770 THE PRODUCTION OF ANTIBODIES TO ALLOGENEIC TUMOR CELLS BY MOUSE SPLEEN IN VITRO. (Eng.) Jolley, G. M. (Linnell Building, Abbott Beyne Sch., Winshill, Burton-upon-Trent, Staffordshire, UK). *Cell Immunol* 25(1): 52-59; 1976.

5772 MONOCYTES OF BREAST-CANCER PATIENTS EXPRESS ANTITUMOR IMMUNITY AS MEASURED BY LEUKOCYTE ADHERENCE INHIBITION IN TEST TUBES (Meeting Abstract). (Eng.) Thomson, D. M. (Div. Clinical Immunology and Allergy, Montreal General Hosp. Res. Inst., McGill Univ., Montreal, Canada); Grosser, N.; Marti, J. *Clin Res* 24(3): 463A; 1976.

5773 IMMUNOBIOLOGY OF HUMAN BLADDER CANCER. (Eng.) Herr, H. W. (Memorial Sloan-Kettering Cancer Center New York, NY). *J Urol* 115: 147-149; 1976.

5774 IMMUNOLOGIC ASPECTS OF HUMAN SARCOMAS. (Eng.) Pritchard, D. J.; Ivins, J. C.; Ritts, R. E. *In: VIth International Symposium of the Society for Combatting Cancer in Nordrhein-Westphalia, Dusseldorf, 17-18 October, 1974.* Swiss League Against Cancer. (Berlin, West Germany: Springer-Verlag): vol. 54: pp. 185-196; 1976.

5775 THE DISTRIBUTION OF MICROTUBULES IN CELLS (Meeting Abstract). (Eng.) Frankel, F. R. (Dept. Microbiology, Univ. Pennsylvania, Philadelphia, PA). *J Cell Biol* 67(2/Part 2): 121a; 1975.

5776 ENHANCEMENT OF TUMORIGENICITY IN ATHYMIC NUDE MICE BY COINJECTION OF TUMOR CELLS AND EMBRYONIC FIBROBLASTS (Meeting Abstract). (Eng.) Stiles, C. D. (Dept. Biology, Univ. California, San Diego, La Jolla, CA 92093); Chuman, L. M.; Saier, M. H., Jr. *J Cell Biol* 70(2/Part 2): 169a; 1976.

See also:

* (Rev): 5433, 5441, 5442, 5444, 5445, 5446, 5447, 5448, 5449, 5450, 5452, 5455, 5456, 5465, 5504, 5507, 5513, 5515, 5522, 5524, 5528
* (Viral): 5653, 5665, 5667, 5689, 5690, 5701, 5713, 5717, 5719, 5722
* (Path): 5810, 5815, 5824, 5849
* (Epid-Biom): 5881

5777 PROSTATIC CARCINOMA: INCIDENCE AND LOCATION OF UNSUSPECTED LYMPHATIC METASTASES. (Eng.) McLaughlin, A. P. (Dept. Urology, Peter Bent Brigham Hosp., 721 Huntington St., Boston, MA 02115); Saltzstein, S. L.; McCullough, D. L.; Gittes, R. F. *J Urol* 115(1): 89-94; 1976.

Prospective pathologic staging by pelvic lymphadenectomy in 60 patients with clinically localized carcinoma of the prostate disclosed a high incidence (35%) of clinically silent and unsuspected lymph node metastases. When present, metastatic disease was frequently bilateral (57%) and most commonly involved the obturator-hypogastric lymph nodes (87%). Micrometastases alone were found in five patients and the potential significance of this finding on survival is discussed. Although the presence or absence of metastases could not be accurately predicted by histologic analysis of biopsy or prostatectomy specimens, the finding of undifferentiated tumor, marked anaplasia and penetration through the capsule correlated positively with nodal metastases. Pelvic lymphadenectomy is a safe and important diagnostic tool in the accurate staging of these patients. Its widespread use is advocated in patients with clinical stage B_1, B_2 and C tumors prior to definitive therapy. Based on the prospective data generated in this study lymphatic metastasis appears to be an early event in the spread of prostatic cancer.

5778 ARRHENOBLASTOMA WITH SUBSEQUENT PREGNANCY. (Ger.) Hoener, M. (Evangelisches Krankenhaus, BRD-432 Hattingen, Bredenschneiderstr. 54, West Germany). *Zentralbl Gynaekol* 98(13): 805-808; 1976.

A 24-yr-old woman with progressive virilization, hypomenorrhea, and sterility was found to have an adnexal growth on the left side. At laparotomy a myoma of the fundus and a mixed-type arrhenoblastoma without evidence of malignancy were discovered. All gynecological stigmata remitted following adnexectomy; there were no recurrences. Arrhenoblastoma is a rare, facultative, malignant growth of the germ cell mesenchyme; its size and composition depend on the interstitial, hormone-producing stroma, and onset is generally in the third decade of life. It is most frequently unilateral, and there are occasionally several foci in the affected ovary. Three histological types have been identified, as follows: a well-differentiated mass with tubules and Leydig cells variously differentiated, a sarcoidlike type with variously differentiated interstitial cells and a sarcomalike stroma, and a mixed type with abortive tubule formation similar to immature glandular tissue. The histology of the proband's tumor was mixed, with immature embryonic tubules, Sertoli cells, and interstitial Leydig cells, suggesting a growth of embryonic male-determined cells in the ovarian hilus or malignant transformation of the ovarian stroma with testicular components. Two years after laparotomy, the patient had a normal pregnancy and birth. She has been symptom-free for 10 yr. (10 references)

5779 MISCELLANEOUS TUMOURS OF EPITHELIAL TYPE. (Eng.) Brown, N. J. *In: Pathology of the Testis.* Edited by R. C. B. Pugh. (Oxford: Blackwell Scientific Publications): pp. 304-316; 1976.

Miscellaneous epithelial tumors of the testis
reviewed, including adenomatoid tumors, argent
carcinoma, cystadenoma of the epididymis, malig
tumors of the epididymis, carcinoma of the appe
testis, and metastatic tumors. In 46 cases of
matoid tumor, the age range was 22-82, there w
right-sided prevalence (15:10), there was no h
of trauma, and there was one case of maldescent
History was frequently long, and this slow-gro
benign tumor does not recur after excision. In
cases of argentaffin carcinoma, there was one
tory of trauma and no maldescended testis. Hist
ranged from 5 wk to 3 yr, and there was no rec
(2-25 yr) after orchiectomy. Five cases of cys
of the epididymis presented at 7-75 yr with no
tory of either trauma or maldescent. The durat
symptoms was generally short, and no recurrenc
were observed after excision of this benign tu
Malignant epithelial tumors of the epididymis
extremely rare. Carcinoma of the appendix test
questionably present in a 25-yr-old man with a
history of a testicular lump that suddenly beg
grow. He was well 5 yr after orchiectomy. Pres
blood-borne metastatic disease in the testis w
observed with a variety of primaries: prostate
bronchus (7), bowel (5), pancreas (2), maligna
melanoma of the skin (2), and bladder (2). (24
ences)

5780 ELASTIC STRUCTURES IN TUMORS OF THE
MARY GLAND. (Rus.) Ovanesbekova, T.
(Inst. Radiology and Oncology, Ministry Health
nian SSR, USSR). *Zh Eksp Klin Med* 15(6): 53-56
1975.

The elastic structures in mammary gland conne
tissue were studied in 30 women operated on fo
mammary gland cancer. Morphologic changes of t
elastic fibers were primarily dystrophic alter
followed by decomposition and lysis of the fib
In all cases, independent of the histology of
cancer, changes in elastic fibers were suffici
constant and clearly visible to be considered
specific for cancerous tumors of the mammary g
Alterations in elastic structures were pathogn
for these tumors and for foci of fibroadenomat
Elastic fibers underwent the most significant
in duct walls and in periductal connective tis
direct relation was found between the degree o
degenerative changes in the elastica and the e
of atypia of cancerous epithelium, its mitotic
ity, and the developmental intensity of the tu

5781 RESPONSES OF C_3H (MECT)--A SUBLINE
STRAIN--TO GONADECTOMY. (Eng.) Pai,
(Cancer Res. Inst., Tata Memorial Centre, Par
Bombay-400012, India). *Indian J Cancer* 13(1):
1976.

The C_3H mouse strain and its subline C_3H (Mec
which were free of mammary tumor virus (MTV),
compared in their responses to gonadectomy. V
smears showed a continual presence of cornifi
cells in C_3H, but polymorphonucleated WBC alo
occasional cornified cells were observed in C
(Mect). Adrenal hyperplasia and nodules devel
both lines, but they were functional in C_3H a
nonfunctional in C_3H (Mect), according to the

ogy and the presence of steroid-dehydrogenase.
ctron microscopy showed that the pituitary cells
C_3H (Mect), especially the gonadotrophs, were
arged, with elongated folded nuclei and irregu-
ly shaped vesicles in the cytoplasm. The overall
ponse of C_3H (Mect) to gonadectomy was similar to
t of mouse strains that are resistant to mammary
cer; the adrenals, however, were hyperplastic.
references)

32 ELECTRON MICROSCOPY OF THIN AND ULTRATHIN
SECTIONS OF NORMAL AND PATHOLOGICAL ELAS-
TISSUE. (Fre.) Adnet, J.-J. (Laboratoire Central
natomie et de Cytologie Pathologiques, C.H.U. de
ms, 45, rue Cognacq-Jay, 51100 Reims, France);
teaux, A.; Pousse, G.; Caulet, T. *Pathol Biol*
ris) 24(4): 293-296; 1976.

ee methods adapted from optical microscopic
hniques are described for identifying normal and
hological tissue under the electron microscope:
the orcein method adapted from that of Tanzer-
a, (b) the fuchsin method adapted from Weigert,
(c) the ferric-hematoxylin technique of Verhoeff.
methods were tested on specimens of normal and
eromatous elastic tissue from the splenic artery
elastic tissue from breast cancer. The orcein
hod was also used in three cases of senile elas-
is. Better results were obtained with the orcein
Weigert methods than with the ferric-hematoxylin
hod. Weigert's gave the best contrast in the
erial and breast tissue. These methods have the
antage of simplicity and usefulness for both
ic and electron microscopy. (8 references)

33 ULTRASTRUCTURE OF TUBULAR INCLUSIONS IN
ENDOTHELIAL CELLS OF PITUITARY TUMORS
SOCIATED WITH ACROMEGALY. (Eng.) Landolt, A. M.
eurosurgical Clinic, Kantonsspital, Ramistr. 100,
-8091 Zurich, Switzerland); Ryffel, U.; Hosbach,
U.; Wyler, R. *Virchows Arch* [*Pathol Anat*] 370(2):
-140; 1976.

xation, staining, and digesting techniques were
plied in a series of pituitary adenomas from human
opsy material to gain insight into the nature of
least one variety of tubular arrays. Tubular
clusions were present in 13 out of 43 pituitary
enomas of acromegalic patients and in a single
romophobe pituitary adenoma. There were none in 76
her pituitary adenomas with differing endocrinolog-
al symptomatology. The arrays were usually located
the perinuclear cistern of capillary endothelial
lls. The tubule diameter in osmium fixed material
asured 19-26 nm and the light core averaged 6-11
. A longitudinal period of about 4.5 nm could be
monstrated with phosphotungstic acid block stain-
g. Fixation with glutaraldehyde and block staining
th ethidium bromide as well as permanganate fixa-
on followed by RNAse treatment showed only the
re of the tubules consisting of globular subunits.
veral histochemical reactions (perchloric acid
traction, methenamine-silver staining, trypsin and
Ase digestion of frozen sections) suggested that
e particles consist of a core of DNA coated with
otein. This DNA particle does not imply an etiolog-
ical relationship. It may be a passenger profiting from a beneficial milieu, a type of extramitochondrial DNA, or a product of a reaction of the endothelial cells to certain environmental stimuli or changes in tissue metabolism due to acromegaly. No virus multiplication was detected in cell cultures or in mice inoculated with fresh tumor material. No significant antibody titers against several virus antigens could be demonstrated.

5784 LARGE CELL TUMORS (SO-CALLED HURTHLE CELL TUMORS) OF THE THYROID GLAND. (Ger.) Ruchti, C. (Inselspital, CH-3010 Bern, Switzerland); Komor, J.; Koenig, M. P. *Helv Chir Acta* 43(1/2): 129-132; 1976.

A clinical survey of large-cell tumors of the thyroid, which feature an altered follicular epithelium, mitochondria-rich cells, and an absence of iodine storage, is presented. Of 69 cases that required surgical intervention during 1953-1974, 42 were histologically adenomas (mean age 52) and 27 were carcinomas (mean age 61). The female: male ratio was 2:1 for carcinoma and 3.2:1 for adenoma. Five of the adenomas recurred in 6 yr as four frank carcinomas and one mixed adenoma (tumor with capsule infiltration). After 3 yr, 3/12 mixed adenomas recurred as two carcinomas and one mixed adenoma. In 3-1/2 yr, one-third of the original 27 carcinomas recurred as carcinomas. None of three original adenomas with epithelial atypia reappeared. Extensive, often remote, metastases in the skeleton, lung, and liver occur within 8 yr only in those patients with carcinoma following removal of an original adenoma. (9 references)

5785 CLONAL ORIGIN OF INHERITED MEDULLARY THYROID CARCINOMA PHEOCHROMOCYTOMA. (Eng.) Baylin, S. B. (Johns Hopkins Sch. Medicine, Baltimore, MD 21205); Gann, D. S.; Hsu, S. H. *Science* 193(4250): 321-323; 1976.

A 30-yr-old black female with inherited medullary thyroid carcinoma and pheochromocytoma (Sipple's syndrome) was a mosaic for glucose-6-phosphate dehydrogenase types A and B in normal tissues (blood, thyroid, and adrenal gland). Both the medullary carcinoma and pheochromocytoma tissue showed a B pattern only. This finding suggests a single clone origin for each of the tumors, indicating that the factors controlling malignancy and benignity for the tumors in Sipple's syndrome may be separate from the basic inherited defect. Possibly, factors in the thyroid and adrenal gland influence the behavior of the neoplastic cells or differences evolve as the stem cells giving rise to the lesions mature and differentiate. Other inherited tumors similarly studied in man appeared to be multiclonal in origin. Therefore, Sipple's syndrome may be the first direct evidence for genetic tumors in man. (24 references)

5786 A CASE OF CARCINOID TUMOR, PROBABLY OF THYMIC ORIGIN. (Jpn.) Tanaka, S. (Second Dept. Surgery, Okayama Univ. Medical Sch., Okayama, Japan); Kimura, H.; Tago, M.; Tanaka, T. *Jpn J Thorac-Surg* 28(11): 807-812; 1975.

X-ray examination of a 32-yr-old man revealed an anterior mediastinal tumor protruding into the right thoracic cavity. The tumor was diagnosed as carcinoid on the basis of a histological examination that revealed rosette formation and argyrophil and neurosecretory granules. The thymic residues adhering to the tumor suggested that it arose from the thymus. There was no clinical evidence of carcinoid syndrome prior to surgery; the patient has been well for 2 yr afer excision of the tumor. A review of the literature revealed that this was only the second case of this type of tumor reported in Japan; the importance of the entity of the tumor is emphasized. (22 references)

5787 ENDOBRONCHIAL PLASMA CELL GRANULOMA (XANTHOMATOUS PSEUDOTUMOR). A LIGHT AND ELECTRON MICROSCOPIC STUDY. (Eng.) Buell, R. (Dept. Pathology, McGill Univ., Montreal, Quebec, Canada); Wang, N.-S.; Seemayer, T. A.; Ahmed, M. N. *Hum Pathol* 7(4): 411-426; 1976.

Two cases of plasma cell granuloma (xanthomatous pseudotumor) from a 26-yr-old female and a 49-yr-old male were studied, and ultrastructural findings were correlated with observations by light microscopy. The tumors were found to be polymorphic at light as well as electron microscopic examination. At light microscopy the endobronchial variant was rich in plasma cells and interwoven, whorl-like, or concentrically arranged spindle cells. Foamy histiocytes and macrophages usually abundant in the intrapulmonary variant were rare. At electron microscopy 20- to 50-nm particles were found at the bronchial mucosal surface but not elsewhere in the lesion. Plasma cells near the bronchial surface contained cytoplasmic fibrils, mitochondria with concentric cristae, and inclusions that bore a close resemblance to adjacent extracellular crystallized hemoglobin. Those in the center of the lesion contained ordinary round inclusions but no other changes. Spindle cells in the interlaced areas were mostly fibroblasts or myofibroblasts, whereas those whorled around capillaries resembled pericytes with basement membranes and intercellular junctions. Year rings like multilayered basal laminae were frequently present between the pericytelike cells and the endothelial cells of the capillaries. The ultrastructure of plasma cell granuloma, like the histologic and clinical aspects, differs from that of sclerosing hemangioma, pseudolymphoma, and malignant plasma cell tumor affecting the lung. (24 references)

5788 RADIOLOGICAL ASPECTS OF THE BASAL CELL NEVUS SYNDROME (GORLIN-GOLTZ SYNDROME). (Ger.) Novak, D. (Radiologische Universitaetsklinik, 2000 Hamburg 20, Martinistrasse 52, West Germany); Bloss, W. *Fortschr Rontgenstr* 124(1): 11-16; 1976.

Four case histories of Gorlin-Goltz syndrome are described and compared with 105 cases from the literature. The four patients, three men and one woman, ranged in age from 30 to 71 yr. The syndrome is
characterized by maxillary or mandibular cysts,
sella and falx calcification, rib anomalies, and
spinal column malformations (scolioses), all of
which are radiologically diagnostic. Furthermore,
combined occurrence of multiple nevoid, pigmented,
or hyperkeratotic basal cell epitheliomas is rout
The basal cell nevi tend toward malignancy and ca
be differentiated from basal cell carcinomas. Nev
localization is mainly on the face, neck, and arm
In the four cases under review, multiple small cy
were also found in the phalanges bilaterally and
the bones of both upper and lower arms. (52 refer
ces)

5789 SKIN, HEREDITY, AND CANCER. (Eng.) Lync
H. T. In: *Cancer Genetics*. Edited by H.
Lynch. (Springfield, IL: Charles C. Thomas): pp.
424-470; 1976.

Skin disorders with an established or suspected
genetic etiology and associated with cancer of t
skin or underlying viscera are reviewed. The cuta
neous and other manifestations and the predomina
cancers associated with a given disorder are tab
lated for autosomal dominant, autosomal recessiv
and sex-linked recessive conditions. Several her
itary syndromes in which keratosis is associated
with cancer are discussed as examples of disease
with distinguishing cutaneous and/or internal
manifestations; these include tylosis (esophagea
cancer) and sclerotylosis (cancers of the tongue
tonsil, breast, and uterus). Other hereditary di
eases linked to cancer are the blue rubber-bleb
syndrome, familial epidermodysplasia of Lewandow
and Lutz, polydysplastic epidermolysis bullosa,
Maffucci's syndrome, vitiligo (gastric carcinoma
albinism, and xeroderma pigmentosum. A detailed
study is presented of a family with xeroderma pi
mentosum, congenital icthyosis, and malignant me
The hereditary aspects of melanoma are further e
plified in studies of two families with cutaneou
malignant melanoma (CMM) and intraocular maligna
melanoma and two families with CMM and other mal
nant neoplasms. The importance for cancer contro
of correlating cutaneous findings with family hi
is stressed.

5790 ALTERATION IN THE SURFACE MORPHOLOGY C
SYNCHRONIZED B-16 MELANOMA CELL DURING
CELL CYCLE. (Eng.) Sauk, J. J., Jr. (Sch. Dentis
Univ. Minnesota, Minneapolis, MN 55455); White,
G.; Witkop, C. J., Jr. *Acta Derm Venereol (Stock*
55(5): 331-336; 1975.

The surface morphology of a synchronous populati
of B-16 melanoma cells derived from C57BL/6J hos
mice was correlated with cell cycle periods duri
scanning electron microscopic observations. The
cells were cultured over numerous generations in
Dulbecco's modified Eagle media supplemented wit
10% fetal calf serum. The cells were synchronize
for G_1-S periods by mitotic shakeoff and for S-
periods by thymidine block. The surface characte
tics of the B-16 melanoma cells in a low-density
partially confluent culture were correlated with
following four periods of the cell cycle: G_1, S

M. G_1 cells were rounded and possessed microvil-
blebs, and ruffles (late G_1). During the S period,
bs and microvilli diminished and disappeared, but
fles were more evident. Late G_2 cells acquired
rovilli, surface blebs, and extended filopodia
began to thicken and round themselves for mito-
. Although the succession of changes in the sur-
e morphology of B-16 melanoma parallels the cell
le, the exact relationship between these events
not completely known. (30 references)

1 MALIGNANT MELANOMA OF THE GALLBLADDER.
REPORT OF THREE CASES AND REVIEW OF THE
ERATURE. (Eng.) Peison, B. (Rahway Hosp., 865
ne St., Rahway, NJ 07065); Rabin, L. *Cancer* 37(5):
8-2454; 1976.

case histories of three men, aged 58, 54 and 50
with primary melanoma of the gallbladder are
orted. The tumors ranged in size from 2.0 to 7.5
in length and 2.0 to 4.0 cm in width; they had a
yplike structure and arose from the gallbladder
a fibrous pedicle. As an organ of endodermal
gin, the gallbladder appears to share the melano-
stic potentiality possessed by similarly derived
ans and, hence, the development of a melanoma
hin the gallbladder is not unexpected. The pres-
e of melanocytes within the gallbladder mucosa is
olute proof that the tumor is primary. Whether
se cells originate from the neural crest and
rate to the gallbladder or result from local
ferentiation from preexisting cells remains to be
wered. These three cases bring to eight the total
ber of cases of primary melanoma of the gallblad-
in the literature.

92 ULTRASTRUCTURAL STUDIES ON THE OCCURRENCE
OF TYROSINASE IN TRANSPLANTABLE AMELANOTIC
ANOMA IN SYRIAN HAMSTERS. (Pol.) Bomirski, A.
klad Biologii i Parazytologii AM, ul. Debinki 1,
-211 Gdansk, Poland); Wrzolkowa, T. *Przegl Dermatol*
(1): 11-18; 1976.

nsplantable amelanotic melanoma was studied cyto-
emically in Syrian hamsters by the tyrosine re-
tion, and compared with the dihydroxyphenylalanine
pa) reaction. Both reactions were positive in
neoplasm under investigation, and the quantity
arrangement of reaction products in the melanoma
lls were similar. The reaction products appeared
the smooth endoplasmic reticulum as flat, oblong
sternae and round vesicles, chiefly in the region
the Golgi apparatus. The similarity in results
both reactions is consistent with the currently
evailing theory that the transformations of
rosine as well as Dopa into melanin are catalyzed
the same enzyme, tyrosinase.

93 COMMON AND INDIVIDUALLY SPECIFIC CHROMOSOMAL
CHARACTERISTICS OF CULTURED HUMAN MELANOMA.
ng.) McCulloch, P. B. (Hamilton Clinic, Ontario
ncer Treatment and Res. Foundation, Hamilton,
tario, Canada); Dent, P. B.; Hayes, P. R.; Liao,
-K. *Cancer Res* 36(2): 398-404; 1976.

Since individual chromosomes can be accurately identified by new banding techniques, atebrin fluorescence was used for chromosome analysis in six cell lines and two primary outgrowths derived from human malignant melanoma. Gross aneuploidy was seen in all specimens, but each culture contained at least one distinctive marker chromosome specific for that cell line in 87 to 100% of metaphases. One of the primary explants contained a marker that was demonstrable in fresh tissue and persisted through two weeks of culture. The same marker was found in all metaphases from two different metastases, but skin fibroblasts from the same patient had a normal chromosome complement. No common marker for human melanoma was found, but in 6 of the 8 cultures the most frequently found marker was formed by a brightly banded chromatid addition. Relative polysomy for Chromosome 7 was found in 7 of the 8 cultures and, for Chromosome 22, in 5 of the 8 cultures. The frequency of polysomy of Chromosomes 7 and 22 was significant at the 5% level.

5794 TREATMENT OF 19 CASES OF MALIGNANT MELANOMAS BY WIDE EXCISION AND LYMPH NODE DISSECTION WITH OR WITHOUT CHEMOTHERAPY. (Jpn.) Miura, T. (Second Dept. Surgery, Univ. Tokyo Sch. Medicine, Tokyo, Japan): Ikeda, S.; Ishida, M.; Kawamura, T. *Jpn J Cancer Clin* 22(4): 324-332; 1976.

Clinical observations of 19 cases of malignant melanoma treated by wide local excision and lymph node dissection with or without chemotherapy are presented. The importance of wide excision of the primary site is stressed. The presence of spread to regional lymph nodes showed a significant relationship to survival. Radical dissection of the regional lymph nodes and radical groin dissection in the case of the lower extremities were significant. The iv and ia infusion of 5-fluorouracil and mitomycin C had no great effect on survival (22 references)

5795 HEMANGIOENDOTHELIOMAS AND HEMANGIOPERICYTOMAS OF THE ORBIT. (Fre.) Offret, M. H. (No affiliation given). *Bull Soc Ophtalmol Fr* 75(4): 385-398; 1975.

Five cases (< 6 yr) of congenital or rapidly onsetting hemangioendothelioma (HE) and seven cases (4 mo-86 yr) of hemangiopericytoma (HP) are described. HE affected the superoexternal, superointernal, and frontal orbita. Radiology showed in one case an increase in the diameter of the ophthalmic artery. Favorable results were obtained with simple biopsy and surgery. The clinical aspects of HP included exteriosis, palpebral masses, or nonpalpable symptomatology. Ocular compression, accompanying variable exophthalmos noted also in HE, reduced visual acuity to 5/10-1/10. The sequelae of neurosurgery included persistent ptosis with recurrent HP. The macroscopic aspects of HE and HP resemble those of fibroma or neurinoma. Reticulin stains indicated intravascular cell proliferation in HE, whereas HP showed cell growth outside the area of perivascular staining with capillary changes. Electron microscopy permits characterization of HP by clear cytoplasm, basal membranes, cytoplasmic filaments, and polyribosomes as well as few Golgi bodies.

5796 MORPHOLOGICAL, HISTOCHEMICAL AND CHROMOSOMAL PATTERNS OF NEUROBLASTOMA PARENTAL AND PURINE RESISTANT LINES.

(Eng.) Ciesielski-Treska, J. (Centre de Neurochimie du CNRS, 11, Rue Humann, 67085 Strasbourg Cedex, France); Warter, S.; Mandel, P. *Neurobiology* 5(6): 382-392; 1975.

To study the regulation of neuroblastoma cell differentiation, the distribution of catecholamines and acetylcholinesterase (ACE) was followed histochemically during maturation. Clones were isolated from tertiary cultures made from the mouse neuroblastoma tumor C1300. Adrenergic clones (M1 and N115), cholinergic clones (M5 and S21), and mutant cell lines resistant to 8-azaguanine and 6-thioguanine were analyzed with regard to morphology, chromosomal pattern, catecholamine content, and ACE activity. There were striking interclonal and intraclonal variations in these parameters. Cells of the M1 line, which had a large number of catecholamine-containing cells, were poorly differentiated morphologically; the N115 clone had a smaller number of such cells (and a lower catecholamine content) but were well-differentiated. Resistant mutants of the M1 and N115 clones had lower catecholamine levels and fewer catecholamine-containing cells than the parental lines. ACE activity was similar in mutants and in the parental lines. In cholinergic clones, the number of ACE-containing cells was higher in M5 cells than in S21 cells. There was a striking increase of choline acetyltransferase activity in M5 resistant cells compared with parental cells, while a decrease was observed in S21 resistant cells. Striking changes were observed in the distribution of chromosomes, and chromosomal markers appeared in mutant cells of all clones. The selection of mutants of M1, N115, and S21 was always accompanied by a reduction in the chromosome number; in the mutant M5, there was an increase in the number of cells with tetraploid chromosomal number. (22 references)

5797 LOCALIZATION OF MOUSE SATELLITE DNA ON CHROMOSOMES OF EXPERIMENTALLY INDUCED GLIOBLASTOMAS; NON-CENTROMERIC LABLE IN ONE GLIOBLASTOMA PRODUCING C-TYPE PARTICLES.

(Eng.) Manuelidis, L. (Yale Univ. Sch. Medicine, 310 Cedar St., New Haven, CT); Manuelidis, E. E. *Int J Cancer* 17(5): 659-669; 1976.

The chromosomal localization of satellite DNA in two tissue culture lines derived from malignant mouse CNS tumors was investigated by in situ hybridization of ^{3}H single-stranded satellite DNA. Both tumors were glioblastomas originally induced by a methylcholanthrene implantation into the cerebrum of C_3H mice; both displayed aneuploid chromosomal constitutions. One of these glioblastomas (TC 541) revealed labeling only of centromeric portions of the chromosomes even in cells containing >200 chromosomes. Therefore it had a pattern of satellite distribution comparable to that of normal cells. The other glioblastoma (TC 509) that produced C-type particles and had a decrease in satellite DNA displayed interstitial and telomeric label in some chromosomes in addition to labeling of the centromeres. The appearance of additional labeling site in TC 509 brings up the possibility that the mous satellite may not be composed exclusively of cent meric DNA. ''Hoechst 33258'' fluorescence showed some interstitial and telomeric bright bands as w as centromeric bright regions, thought to be cons tent with in situ studies. It is possible that a C-type virus inserted at or near a satellite regi of TC 509 might have incurred a minor loss of sat lite DNA and that viral insertions of TC 509 resu in translocation or reorganization of the satelli of these interstitial regions.

5798 NUCLEAR SIZE AND CHROMATIN CONCENTRATIO IN TRANSITIONAL CELL CARCINOMA OF THE HUMAN URINARY BLADDER.

(Eng.) Fossa, S. D. (Norwe Radium Hosp., Montebello, Oslo 3, Norway); Kaalhu O. *Beitr Pathol* 157(2): 109-125; 1976.

Feulgen absorption cytophotometry was used to mea ure cell nuclei from 25 biopsy specimens from patients with transitional cell carcinoma of the ur nary bladder. The mean values of nuclear area, DN content, and chromatin concentration after scanni of 100 nuclei per specimen were compared with tho from a control group consisting of 10 specimens o normal transitional cell epithelium. Within the s ploidy class, the more differentiated carcinoma cells showed nuclear enlargement and decrease of mean chromatin concentrations. This could serve a means of differentiating between normal and neopl tic nuclei with a high degree of statistical prob ability. This increase in size and decrease in ch matin concentration could be a morphological expr sion of chromatin despiralizing as a result of an increase in nuclear function. It could also be th result of dedifferentiation of the nucleus or nuclear dystrophy. However, it is not known if thes nuclear changes are characteristic of a precancer stage or whether they indicate an infiltrating ca cer. Undifferentiated tumors could have the same higher mean chromatin concentration as the contro group because of the many high-polyploid nuclei. Undifferentiated tumors contained numerous giant nuclei, whereas they were rare in well-differenti carcinoma.

5799 ENZYMATIC STUDIES OF GLYCOGEN METABOLIS IN NONMALIGNANT AND MALIGNANT BIOPSIES FROM THE HUMAN UTERINE CERVIX.

(Eng.) Pedersen, S N. (Fibiger Lab., Ndr Frihavnsgade 70, DK-2100 Co hagen 0, Denmark). *Acta Obstet Gynecol Scand* 54(443-448; 1975.

Differences in glycogen metabolism between nonmal nant, premalignant, and malignant tissue samples from the human uterine cervix are investigated wi the use of tissue specimens from 147 women (20-ov 50 yr) with gynecological disease (64 with cervic carcinomas, 6 with carcinoma in situ, and 77 with nonmalignant cervical disease). The glycogen leve for 41 patients with cervical carcinoma (1.18 ± mg/g wet wt of tumor tissue) and for 6 patients w carcinoma in situ (1.11 ± 1.92 mg/g) were signifi

ly lower than the normal value found in the 58
ents with nonmalignant disease (8.01 ± 1.28
). A particularly low glycogen content (0.75 ±
mg/g) was observed in 11 patients who either
psed or died during the observation period (17-
o). Glycogen synthetase I and D values were
ificantly elevated in malignant tissue samples
54 ± 11.90 and 87.15 ± 30.18 nmoles/mg protein/hr,
ectively) compared to normal values of 8.06 ±
and 23.70 ± 9.60. No significant differences in
phorylase activities, however, were demonstrated
een malignant and normal tissue samples. A low
ogen content thus appears to be an early sign of
gnancy in the uterine cervix. The low content
rently is not due to enzyme deficiency; it may
ibly be explained by a lack of substrate result-
from increased glucose catabolism. Increased
ogen synthetase activities might be interpreted
sign of cellular dedifferentiation. (24 refer-
s)

FIBRINOLYTIC ACTIVITY OF CARCINOMA OF THE
COLORECTUM. (Eng.) Newstead, G. L. (Prince
ales Hosp., Randwick, New South Wales, Australia);
fiths, J. D.; Salsbury, A. J. *Surg Gynecol Obstet*
l): 61-64; 1976.

ty patients with carcinoma, mostly of the colo-
m, and five controls without malignant tumors
investigated to elucidate the relationship
een tumor fibrinolytic activity and the release
irculating malignant cells. The nature of tumor
inolytic activity was also considered. The most
ificant fibrinolytic activity, 80%, was seen in
draining from the tumors. Circulating malig-
cells were recovered from half the patients,
n those with significant blood fibrinolysis,
ery from the draining vein reached 89%. The
undifferentiated tumors appeared to be more
e and released more cells. The fibrinolytic
ity of tumor tissue derives from inflammatory
, dead tumor cells, avascular areas of the
, and the vascular endothelium and is probably
olytic as well as purely fibrinolytic. (33
ences)

OBSERVATION OF THE TRANSFORMATION OF SCLER-
OMA INTO SQUAMOUS CELL CANCER. (Rus.)
nko, G. M. (Kalinin Medical Inst., Kalinin,
. *Vestn Otorinolaringol* (5): 92-93; 1975.

pus cell cancer developed in a 61-yr-old man
e location of a scleromic focus 39 yr after
nset of scleroma of the upper respiratory pas-
. When scleroma was diagnosed, the patient
ved repeated courses of radiotherapy, but the
became refractory to treatment. Several years
a thickening appeared above a tracheostomy,
adial chondrioperichondritis was diagnosed.
dic streptomycin therapy was administered for
t 20 yr. The tumor disappeared following telegam-
rapy, which was administered in an initial
e of 5,914 R, and there has been no recurrence
e cancer for 1 1/2 yr.

5802 PULMONARY ASBESTOSIS AND TUMORS OF THE LUNGS (CASE REPORT AND LITERATURE ANALYSIS). (Pol.) Hajdukiewicz, Z. (Instytutu Patologii AM, 90-141 Lodz, ul. Narutowicza 96, Poland); Slodkowska, J.; Szaniawski, W. *Patol Pol* 26(4): 551-556; 1975.

Two asbestos workers presented with coexisting pulmonary asbestosis and tumors of the lungs (squamous cell carcinoma and pleural mesothelioma). A 59-yr-old man who had smoked 20 cigarettes daily since youth was diagnosed with pulmoary asbestosis after 5 yr of work in the industry and developed a tumor of the right lung 10 yr later. Postmortem examination performed 18 hr after death revealed typical pulmonary asbestosis, with changes affecting primarily the inferior lobes. Autopsy of a 45-yr-old woman who had suffered from left wet pleurisy 2 yr earlier showed widespread pleural infiltration of the left chest wall extending into the endocardium and diaphragm. The literature on asbestosis and lung tumors is reviewed.

5803 STOMACH CANCER IN THE RAT INDUCED BY N-METHYL-N'-NITROSOGUANIDINE--STROMAL ASPECT, WITH SPECIAL REFERENCE TO THE BASEMENT MEMBRANE. (Jpn.) Ishikawa, M. (First Dept. Surgery, Okayama Univ. Medical Sch., Okayama, Japan); Okajima, K.; Fujii, Y.; Araki, K.; Terada, K.; Hanabusa, S. *Jpn J Cancer Clin* 22(4): 312-317; 1976.

Sixty-nine rats were given N-methyl-N'-nitrosoguanidine po and the patterns of epithelial proliferation that were induced were analyzed by both light and electron microscopy. Lesions occured in 67 rats: 4 of them showed severe atypism and could be easily diagnosed as carcinomatous (type C lesions); 43 did not represent marked atypism, and their glands were surrounded by regular basement membranes and fibroblastic sheaths (type A lesions). The remaining 20 lesions (type B) were moderate grades of cellular and glandular atypism with complete or partial absence of basement membranes and fibroblastic sheets. The basement membrane in these lesions appeared corrugated or multilayered. The changes in the basement membrane in these cancers may be the results of irregular interactions of the epithelial and mesenchymal elements. (14 references)

5804 CYTOCHEMICAL POLYMORPHISM OF ACID PHOSPHATASE IN HAIRY CELL LEUKEMIA. (Ger.) Schaefer, H.-E. (Patholog. Inst., Univ. Koln, D-5000 Koln 41, Josef-Stelzmann-Strasse 9, West Germany); Hellriegel, K.-P.; Zach, J.; Fischer, R. *Blut* 31(6): 365-370; 1975.

Tartaric acid (TA), 10^{-2} M, failed to inhibit acid phosphatase (AP) histochemically in hairy cell lymphocytes of 3/7 subjects with confirmed leukemic reticuloendotheliosis. Lymphocytes from all three subjects showed high AP activity, characterized by light-staining, amorphous granulation with diffuse distribution. In a fourth patient with high AP, TA was almost completely inhibitory. In another subject AP was undetectable (at autopsy); in two other subjects, weakly positive AP was completely or almost completely inhibited by TA. Identical reactions occurred over a pH range between 4.8 and 5.6. AP sensitivity to TA was also independent of the site or technique of cell harvest (peripheral blood, sternal marrow, spleen). All cases presented with pancytopenia and most inhibited splenomegaly, hepatomegaly, and fibrotic marrow. Ages ranged from 37 to 69 yr; there were two women. The degree of hairy cell involvement ranged between 9% and 77% of the total lymphocyte count. Chloroacetic acid esterase, peroxidase, and PAS were negative in all histochemical specimens. The absence of AP tolerance of TA does not exclude the diagnosis of hairy cell leukemia. The presence of an anomalous AP in hairy cell lymphocytes will tend to confirm the diagnosis.

5805 CYTOGENETIC STUDY OF ACUTE LEUKEMIA AND THE EFFECT OF 6-MERCAPTOPURINE ON BLOOD CELL CHROMOSOMES. (Rus.) Dygin, V. [illegible]. (S. M. Kirov Military Medical Acad., Leningrad, USSR); Goroshchenko, [illegible] L.; Fedortseva, K. F.; Tam[illegible]va, S. E. *Probl Gematol i Pereliv Krovi* 21(1): 30-36; 1976.

The effect of 6-mercaptopurine (6-MP) on the karyotype of leukemic blood cells and DNA synthesis was studied in vivo and in vitro. The karyotype of the peripheral blood cells in 17 patients with acute leukemias receiving additive doses of approximately 11,000 mg was normal (modal number) in most. Aneuploidy and hypoploidy occurred in up to 7% of the cases, in which the missing chromosomes were from different groups (e.g., C and G). Three patients were polyploid, with metaphase plate endoreduplication. The main aberration involved single and double fragmentation, breaks in the centromere region, and translocation. Chromatid breaks were found in 72% of the cases. In vitro, 6-MP induced four to five times the number of chromosome aberrations in all phases of the cell cycle compared to control cultures. The main anomaly was single fragmentation (70%). G_0 lymphocytes had a lower level and intensity of DNA synthesis. Mitotic arrest was observed; the number of labeled nuclei did not exceed 11% even after 69 hr, and the onset of labeled nuclei was delayed for 12 hr in G_1 compared to controls.

5806 MALIGNANT DISEASE IN HETEROZYGOUS CARRIERS (Eng.) Swift, M. (No affiliation given). *Birth Defects* 12(1): 133-144; 1976.

Families of patients with autosomal recessive syndromes were analyzed to determine if they have a predisposition to malignant neoplasms. Each blood relative of a patient with an autosomal recessive syndrome has a specific prior probability of being heterozygous for the gene for that syndrome. A significant increase in deaths from cancer was found in eight families of patients with Fanconi's anemia. A highly significant increase in deaths from malignant neoplasms was noted among blood relatives of 27 ataxia-telangiectasia patients, especially those who died before age 45. Both Fanconi's anemia and ataxia-telangiectasia were associated with an increased risk for lymphopoietic and gastrointestinal malignancies. The spouses of blood relatives in the study were used as controls; there were significantly fewer deaths from cancer than would be expected in a random sample of the general population. The method used to determine the relative risk of a heterozygot developing a malignancy is explained. The limitations and problems encountered in family studies are discussed. It is recommended that additional autosomal recessive syndromes associated with neoplastic disease be identified and that the genetics and epidemiology of recessive syndromes be clarified. (19 references)

5807 NON-RANDOM KARYOTYPIC EVOLUTION IN CHRONI MYELOID LEUKEMIA. (Eng.) Mitelman, F. (Dept. Clinical Genetics, Univ. Hosp., S-221 85 Lund, Sweden); Levan, G.; Nilsson, P. G.; Brandt, L. *Int J Cancer* 18(1): 24-30; 1976.

The chromosome banding pattern in the bone marrow and/or spleen cells of 10 patients in the blastic phase of chronic myeloid leukemia (CML) was analyze by the trypsin-Giemsa technique. Karyotype analysis showed that the chromosomal aberrations occurring i addition to the Philadelphia chromosome (Ph^1) were strictly nonrandom. An extra Ph^1, trisomy 8, and/or trisomy for the long arm of chromosome 17 were observed in all cases. This consistent pattern of chromosome involvement in CML was confirmed in 57 cases from the literature. In 88% of the total number of cases with further changes, at least one of the three main chromosomal aberrations was found (major route of karyotypic evolution). (35 referenc

5808 AN IN VITRO MODEL OF PREMALIGNANCY (Meeting Abstract). (Eng.) Anderson, L. W. (Sch. Public Health, U. C. Berkeley, CA); Smith, H. S. *J Cell Biol* 67(2/Part 2): 9a; 1975.

5809 POLYCYTHAEMIA IN ANDROGEN-DEPENDENT APLAS TIC ANAEMIA. (Eng.) Low-Beer, T. S. (Sell Oak Hosp., Birmingham, UK); Scott, G. L. *Br Med J* 1(6003): 197-198; 1976.

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6 LYMPHOMA OF THE THYROID: AN UNUSUAL CLINICAL COURSE IN A PATIENT POSSESSING A
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5837 NERVE SUPPLY AS A STIMULATOR OF THE GROWTH OF TISSUES, INCLUDING SKIN (Meeting Abstract). (Eng.) Whimster, I. W. (Dept. Dermatology, St. Thomas's Hosp., London, England). *Br J Dermatol* 95(14/Suppl): 9; 1976.

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COLONIC POLYPOSIS? (Ger.) Ammann, R. (Gastroenterologische Abteilung, Department fuer Innere Medizin der Universitaet, Kantonsspital, CH-8091 Zurich, Switzerland); Deyhle, P.; Sulser, H. *Schweiz Med Wochenschr* 106(26): 894-897; 1976.

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5864 CONTRALATERAL RECURRENT MYXOMA OF THE HEART. (Eng.) Dang, C. R. (UCD Professional Bldg., Dept. Thoracic Surgery 213, 4301 X St., Sacramento, CA 95817); Hurley, E. J. *Ann Thorac Surg* 21(1): 59-62; 1976.

See also:

* (Rev): 5415, 5423, 5433, 5436, 5439, 5451,
5453, 5454, 5455, 5456, 5457, 5458,
5459, 5460, 5461, 5462, 5463, 5464,
5465, 5466, 5467, 5491, 5498, 5509,
5523, 5524, 5525, 5526, 5527, 5530,
5531, 5532, 5533, 5534, 5540
* (Chem): 5557, 5591, 5598
* (Phys): 5625, 5626, 5631
* (Viral): 5657, 5689, 5693, 5694
* (Immun): 5726, 5729, 5731, 5742, 5747, 5774
* (Epid-Biom): 5865, 5867, 5873, 5875, 5878,
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5865 PRIMARY MULTIPLE CARCINOMAS IN GYNECOLOGY.

(Ger.) Methfessel, H. D. (Universitaets-Frauenklinik, DDR-402 Halle/Saale, Leninallee 24, East Germany); Methfessel, G.; Djakite, S. *Zentralbl Gynaekol* 98(7): 421-428; 1976.

A survey of 4,358 women with gynecological malignancy (66% cervical and 16% endometrial carcinomas) treated as inpatients between 1958 and 1972 established 53 instances of first tumors, defined as neoplasms occurring before the onset of cancer in the reproductive system. Of 36 primary growths before the occurrence of cervical carcinoma, 25 were of mammary origin; 2 each were found in the endometrium, cutis, and stomach, with 1 each in the vulva, ovary, gallbladder, tongue, and peripheral leukocytes. The following localizations were established before the onset of endometrial carcinoma: six mammary, two rectal, one vaginal, one cutical, and one gastric. Three mammary growths preceded ovarian tumors, one mammary and one cutical growth each preceded two carcinomas of the vulva, and one cutical growth preceded one vaginal carcinoma. A second tumor is defined as occurring simultaneously with, or subsequent to, formation of a gynecological neoplasm. There were 53 of these, 9 each with mammary or vulvar localizations, 7 with leukemias, 6 with endometrial tumors, and the remaining 22 with bronchial, cuticular, ovarian, gastric, rectal, renal, esophageal, tonsillar, colon, gallbladder, and maxillary involvement. Maximum time-to-tumor was 17 1/2 yr, minimum 2 1/2 yr. Based on a calculation designed to subvert the variable 'time of observation,' no statistically significant difference was found in multiple primary tumorigenesis after the onset of endometrial or cervical carcinoma. Also, multiple primary tumors in the target population occurred neither more nor less frequently than in the female population at large. That is, their incidence is accidental, and the onset of second tumors follows the distribution characteristic of general cancer morbidity. (28 references)

5866 TESTICULAR TUMOURS--INTRODUCTION. (Eng.)

Pugh, R. C. *In: Pathology of the Testis.* Pugh, R. C. ed. (Oxford: Blackwell Scientific tific Publications): pp. 139-159, 162-163; 1976.

This general review of testicular tumors serves as an introduction to the more specific treatment of individual tumors and deals with the incidence, frequency, classification, nomenclature, and some of the clinical features of testicular tumors. Testicular tumors are rare, and in the United Kingdom both the incidence and death rates are bimodal, with peaks between 20 and 40 and in the elderly. The incidence in various countries varies rather widely, suggesting a genetic factor; the incidence in nonwhite countries tends to be considerably lower. Tumors of the testis are classified as seminoma, teratoma, combined seminoma and teratoma in the same testis, Sertoli cell mesenchyme tumors, interstitial cell tumors, yolk sac tumors, malignant lymphomas, miscellaneous tumors, metastases, and tumors of uncertain diagnosis. Tumors of the epididymis and cord include adenomatoid tumor, tumors of connective tissue and muscle, miscellaneous tumors, metastases, and tum
of uncertain diagnosis. Seminoma, teratoma, combi
tumor, and malignant lymphoma account for 91% of
tumors of the testis, and embryonal sarcoma and
other connective tissue tumors, adenomatoid tumor
and metastases account for 76% of tumors of parat
ticular structures. These data are derived from
histological specimens from 3,196 patients over a
16-yr period. Unilateral disease was most common
(only 57 cases of bilateral tumor), with a 5:4 pr
erence for the right testis. In 123 patients ther
was a history of undescended testis, and 46 of th
had either an undescended testis removed or an or
chidoplexy. The role of cryptorchidism remains un
clear. Family history was positive in six cases
(three families). Seventy-four percent of the tes
ticular tumors occurred in the three decades from
20-49. A history of trauma in 183 patients is con
sidered of very doubtful etiologic significance.
Testicular swelling is the most prominent clinica
feature of all testicular tumors. In 100 cases,
tumor was discovered only on routine physical exa
tion. The duration of symptoms was variable. In
second primary malignancy had developed, and this
second tumor was the cause of death in 17. The li
tions of biopsy and the risk of local disseminati
are discussed. (30 references)

5867 STUDIES ON THE INCREASING INCIDENCE OF ENDOMETRIAL AND OVARIAN CARCINOMAS IN CZECHOSLOVAKIA DURING THE 1960-1973 PERIOD. (Ger

Rosol, M. (Universitaets-Frauenklinik, Karls-Uni
sitaet Kunz, Hradec Kralove 500-36, Czechoslovak
Strnad, L.; Havel, V.; Andrys, J.; Vacha, K. *Zentralbl Gynaekol* 98(3): 175-182; 1976.

The relative incidence of ovarian, endometrial,
other gynecological carcinomas in Czechoslovakia
since 1960-1 is analyzed. The number of all new
gynecological tumors, including breast cancer, r
from 93.9/100,000 women at the onset of the 1960
to 107.3 at the onset of the 1970's. The inciden
of endometrial carcinoma rose from 12 to 17/100,
women, ovarian cancer from 12 to 14, and mammary
carcinoma from 30 to 39; cervical carcinoma fell
from 31 to 23/100,000. In 1961-3 and 1971-3, 2,5
and 3,196 new cases of ovarian carcinoma, respec
ively, were recorded for all age groups, for a 2
increase. The incidence of new cases per 100,000
women in given age groups showed increases at ev
age level, even when the absolute number decline
especially marked elevations occurred in the 40-
and over-70 age groups. The total number of new
endometrial carcinoma cases in 1961-3 and 1971-3
respectively, was 2,446 and 3,960, a 60% increas
The incidence of new cases in 100,000 women acco
ing to age group showed increases at every age l
except 0-29 yr, during which it declined; especi
marked elevations occurred in the 30-39, 60-69,
over-70 age groups. The 1.5-fold increase in abs
number of over-70 patients cannot be entirely at
buted to larger numbers of women living beyond 7
yr; it must reflect the fact that abnormal endom
growths are three-quarters more frequent among t
elderly. Although the average age of ovarian can
has remained relatively stable at about 56 yr, t

endometrial cancer has risen from 58 to 61 yr
ween 1961 and 1973. Very few of the present over-
group could have had exposure to estrogens in
lier years, especially during menopausal inter-
s. However, this age group--perhaps similar to the
nger age groups presently using antifertility
nts and presenting with higher rates of endo-
rial cancer--had very low parity due to politi-
upheavals during their choice child-bearing
rs. It is possible that any interference with
normal arrest of endometrial proliferation is
cinogenic. Moreover, the effect of nonsteroids
h estrogenic activity in foodstuffs, cosmetics,
even normal body constituents (cardiac glycosides)
ht be contributory. (29 references)

8 RESULTS OF CYTOLOGICAL AND HISTOLOGICAL
INVESTIGATIONS OF THE UTERINE CERVIX FOL-
ING PROLONGED USE OF HORMONAL CONTRACEPTIVES.
r.) Ebeling, K. (Universitaets-Frauenklinik, DDR-
Leipzig, Philipp-Rosenthal-Str. 55, East Ger-
y); Rueckhaberle, B.; Kuehndel, K.; Schulz, St.;
enert, M. *Zentralbl Gynaekol* 98(7): 385-392; 1976.

long-term effect of oral contraception on cer-
al cytology is explored in 880 females between 18
45 yr of age. A combined preparation of Ovosis-
and Non-ovlon was administered from 1 to 8 yr
an, 2.4 yr). Data were matched against a control
up of 479 females of equivalent age. Evidence of
hology was found in 669 cases. Dysplasia and
invasive, early invasive, and invasive carcinoma
e the principal atypical epithelia. There was no
nificant difference in dysplasia between control
test groups. There was a very significant reduc-
n ($p < 0.001$) in preinvasive, early invasive, and
asive states--especially at ages 35 and above--
er oral contraception for at least 1 yr. A favor-
e shift of 5.10 yr in peak age during oral contra-
tion is particularly noticeable in intraepithelial
pia and early invasive carcinoma. (27 references)

9 THE HEALTH OF RETIRED FIBROUS GLASS WORKERS.
(Eng.) Enterline, P. W. (Univ. Pittsburgh,
duate Sch. Public Health, Pittsburgh, PA 15261);
derson, V. *Arch Environ Health* 30(3): 113-116;
5.

tudy was made of 416 men (mean work experience
4 yr) who retired during the period 1945 to
2 from six plants engaged mainly in the manu-
ture of fibrous glass insulation. Their mor-
ity experience was compared with that of white
in the entire United States living in comparable
and time intervals. The mean follow-up period
m first exposure was about 30 yr. Overall mor-
ity was lower than average; there was no evidence
an excess in respiratory cancer mortality. No
otheliomas were noted. The low mortality rate was
ributed to overall good health. For 115 men who
ired from the same plants in the same period due
a disability, the distribution of disabilities by
se was compared with an expected distribution
ed on the experience of the Social Security Admin-
ration. This comparison showed no evidence of any
unusual health hazards among fibrous glass workers, except a possible excess in chronic bronchitis.

5870 CANCER IN THE CHEMICAL INDUSTRY. (Ger.) Loskant, H. (Werksaerztliche Abteilung, Hoechst AG, Frankfurt am Main-Hoechst, West Germany). *Umschau Wissenschaft Tecknik* 76(1): 21-22; 1976.

An 18-yr retrospective survey of male cancer mortality is correlated with type of occupational exposure in 10 chemical and automobile plants. Mortality rates for 16 different primary tumor sites are also correlated with expected death rates for the general, nonindustrial population. The numbers of occupationally linked cancers were higher than expected for the general population at the following sites: throat and oral cavity (47%), colon and rectum (16%), urinary tract (45%), lung (19%), skin (34%), connective tissue and bone (10%), prostate (11%), and endocrine tissue (9%). They were lower than expected at the following sites: esophagus (41%), stomach (11%), liver and gallbladder (30%), pancreas (7%), small and large intestine (19%), and lymph and hemopoietic tissue (9%). The increase in colon and rectal tumor mortality is associated with office workers not directly involved in the routine handling of chemicals. Correlations were suspected between urinary tract tumors and pesticides, pesticide intermediates, or aromatic amines, and between lung cancer and sulfur, selenium, or tellurium exposure.

5871 VINYL CHLORIDE: EPIDEMIOLOGICAL STUDIES AND PREVENTIVE MEASURES. (Eng.) Owen, R. (London, England). *Adv Tumour Prev Detect Charact* 3: 238-241; 1976.

Epidemiological studies are being made to assess the effects of occupational exposure to vinyl chloride in Great Britain. Cancer and mortality rates of 6,000-8,000 past and present workers in five polyvinyl chloride plants are being related to vinyl chloride exposure in terms of time and concentration. A retrospective study of cases of angiosarcoma of the liver is underway to evaluate the association between this disease and occupation. The medical and social histories of these cases are also being compiled. The United Kingdom has lowered its interim standards for vinyl chloride exposure to a ceiling value of 30 ppm and a time-weighted average of 10 ppm. (No references)

5872 CANCER OF THE LUNG IN WOMEN. (Eng.) Harley, H. R. S. (Llandough Hosp., Penarth, Glamorgan, GP6 1XX, Great Britain). *Thorax* 31(3): 254-264; 1976.

A study in Wales of 132 women with cancer of the lung admitted consecutively during 1964-1968 and of 13 other women submitted to surgery at an earlier period showed that the prognosis for women was worse than for men. Of the 132 women in the consecutive series who were followed up, only five were still alive at 5 yr, and the 5-yr survival rate after resection in 35 women was less than one-half of that for men. The worse prognosis for women appears to be due to some sex-linked factor, as it cannot be explained by the age of the patient or by the histology, location, early aggressiveness, or resectability of the growth. Sex and nationality appear to influence the relative incidence of the disease, but the influence of tobacco and other atmospheric carcinogens is obscure. (42 references)

5873 BRONCHIAL CARCINOMA, POSTRESECTION SURVEY.

(Ger.) Kutschera, W. (I. Chirurgische Abteilung, Krankenhaus der Stadt Wien-Lainz, Wolkersbergenstr. 1, A-1130 Vienna, Austria). *Thoraxchirurgie* 24(3): 164-176; 1976.

A review of 3,792 cases of bronchial carcinoma in patients from 1958 to 1973 is presented with emphasis on postresection prognosis. Of the total, 1,870 were not surgically treated, 345 received thoracotomies, and 1,577 (1,407 men, 170 women) were resected. The inoperable cases increased and the number of surgical interventions decreased during the period. There were 783 pneumonectomies, 756 lobectomies, and 38 sequential resections among the 1,577, whose average age was 59.5 yr. Pneumonectomy decreased 13% and lobectomy increased 13%. The upper lobes of the lung were involved bilaterally in two-thirds, and the lower lobes in one-third, of the resections. One-quarter of the cases each were in stages I and III and two-fifths were stage II. Peripheral carcinoma, especially on the right, increased in the period about 20%; the sex ratio was approximately seven women to five men at this localization. Squamous carcinoma was found in 69% of the male and 35% of the female resections; solid carcinomas were more evenly distributed at 12%-15%, while adenocarcinoma constituted 38% of the female and only 9% of the male resections. Half of the adenocarcinomas from female patients could not be correlated with tobacco consumption; only one-quarter of the women smoked 10 to more than 20 cigarettes daily, accounting in part for the lower rate of central carcinoma. That four-fifths of the women were engaged in occupational pursuits analogous to the men might relate to the increased incidence of female bronchial carcinoma. Squamous carcinoma accounted for 51% of resected peripheral tumors, adenocarcinoma for 25%, and solid-type carcinoma for 15%. Of the central tumors, 69% were squamous carcinoma, 11% solid-type, and 7% adenocarcinoma. (No references)

5874 LARYNGEAL NEOPLASM MORTALITY IN OKLAHOMA: 1950-1970.

(Eng.) Cucchiara, A. J. (Dept. Biostatistics and Epidemiology, Coll. Health, Div. Public Health, Univ. Oklahoma Health Sciences Center, PO Box 26901, Oklahoma City, OK 73190); Asal, N. R. *South Med J* 69(7): 908-910; 1976.

The death certificates of Oklahoma residents with laryngeal cancer over a 20-yr period were studied to corroborate findings of the current literature. Sex-race-specific death rates per 100,000 for white, nonwhite, and American Indian populaces displayed a distinct sex and racial pattern: 38.52, 28.11, and 12.52, respectively, for men; 5.25, 1.23, and 0 for women. Aged-adjusted death rates per 100,000 for white men for the four consecutive 5-yr periods wer 19.00, 21.64, 20.91, and 26.81; these rates showed constant mortality for laryngeal cancer for the period between 1950 and 1965, followed by an increa of approx 30% from 1966 to 1970. Similar analysis o white women, nonwhite men, and nonwhite women did not reveal such a clear secular pattern, although the adjustment for age did preserve the sex and racial pattern indicated above. Age-adjusted laryngeal cancer death rates of 42.34, 46.14, and 48.51 for the rural, nonmetropolitan, and metropolitan counties, respectively, indicated a direct association between mortality and degree of urbanization. All findings appeared to be in concordance with those given in the recent literature. (23 reference

5875 HEPATITIS B_s ANTIGEN, MALARIA TITERS, AND PRIMARY LIVER CANCER IN SOUTH VIETNAM.

(Eng.) Welsh, J. D. (Univ. Oklahoma Health Sciences Center, P.O. Box 26901, Oklahoma City, OK 73190); Brown, J. D.; Arnold, K.; Mathews, H. M.; Prince, A M. *Gastroenterology* 70(3): 392-396; 1976.

A total of 306 individuals from South Vietnam were studied: 61 had a diagnosis of primary liver cancer (38 with tissue diagnosis, and 23 with clinical diagnosis and a positive alpha-fetoprotein), and nine had viral hepatitis; 101 were hospitalized patients (60 with various other forms of liver dise and 41 without liver disease); 94 were blood donors and 29 were drug users. Alpha-fetoprotein was prese in 45 of 61 (74%) of those with primary liver cance (PLC). Using immunoelectroosmophoresis, hepatitis antigen (HB_sAg) was found no more frequently in those with PLC than in the other groups studied. I contrast, using a radioimmunoassay technique HB_sAg was present three to eight times as frequently in the PLC patients as in other subjects without viral hepatitis. There was a close relationship between the presence of alpha-fetoprotein and HB_sAg in the patients with PLC. Malaria seropositivity rates wer no different in the PLC groups than the other grou It appears that in South Vietnam PLC is associated with an increased frequency of HB_sAg.

5876 MALIGNANCIES OF THE EAR.

(Eng.) Conley, (Pack Medical Foundation, 137 East 36th St., New York, NY 10016); Schuller, D. E. *Laryngoscope* 86(8): 1147-1163; 1976.

Two hundred and seventy-three cases of cancer of the ear are reviewed. The majority (69%) occurred the auricle, predominantly the helix and postauricu areas. The external auditory canal and middle ear were involved in decreasing numbers. Epithelial lesions (melanoma excluded) dominated on the auricl and in the ear canal, with the highest incidence occurring in the fifth and sixth decades of life. Children were immune at these sites but represente 16% of the middle ear malignancies of somatic and

rogenous tissue origin. The early signs and symp-
s suggested chronic inflammatory disease of the
, and over 60% of patients gave a history of
onic ear disease. Involvement of the bone was
nd in 60% of the patients. Polytomography was
ful in documenting disease affecting the bone. A
poral bone resection, with modifications, is
icated in all operable cases with bone destruc-
n. A temporal bone resection combined with post-
rative irradiation has improved curability and
liation. (9 references)

7 THE INCIDENCE OF LIP CANCER AND ITS MAN-
DIBULAR METASTASIS. (Eng.) Borcbakan, C.
pt. Oral and Maxillofacial Surgery, Ankara Univ.
tal Faculty, Ankara, Turkey); Muderris, S.; Ergen,
Jpn J Clin Oncol 6(1): 27-32; 1976.

etrospective evaluation was made of 170 patients
determine the distribution of lip cancer and the
idence of consequent mandibular metastasis through
mental foramen. The highest incidence of lip
cer was seen between the ages of 40-50 in men and
60 in women. Metastasis to the mandibula developed
11.15% of the cases after the primary treatment.
adical rather than conservative emphasis on resec-
n is recommended. (11 references)

8 FAMILIAL RISK AND CANCER CONTROL. (Eng.)
Lynch, H. T. (Dept. Preventive Medicine
Public Health, Creighton Univ. Sch. Medicine,
ha, NB 68178); Brodkey, F. D.; Lynch, P.; Lynch,
Maloney, K.; Rankin, L.; Kraft, C.; Swartz, M.;
tercamp, T.; Guirgis, H. A. *JAMA* 236(6): 582-584;
6.

family history of cancer in 4,515 patients
eened consecutively was studied by a multiphasic
ile cancer detection unit. After age correction,
results showed that 8.9% of the probands had
cer when there was one cancer in a single first-
ree relative, 16.2% had cancer when two family
bers had been affected, and 27.4% had cancer when
ee or more family members had been affected. This
stituted a significant correlation between family
personal histories of cancer in these patients.
references)

9 CANCER MORTALITY AND INCIDENCE IN THE
CANTON OF ZURICH. (Ger.) van der Linde, F.
richer Krebskrankenregister, Nelkenstrasse 15,
3006 Zurich, Switzerland). *Soz Praeventivmed*
5): 199-200; 1975.

cancer morbidity and mortality statistics for
9-1972 in a relatively dense urban area were
mined and compared to both the host country and
US. During that period, 8,716 persons succumbed
malignancy; the rate was 223 men to 173 women per
,000 population. The data show a western pattern
increased colon, pancreatic, and bronchial carci-
a and decreased gastric and esophageal carcinoma.
Bronchial carcinoma in men and mammary carcinoma in women account for 25% and 20%, respectively, of all cancer mortality; these rates are nearly double that of the next most frequent cause of mortality, colorectal carcinoma. (3 references)

5880 STUDIES OF POSSIBLE CAUSES OF AN INCREASED INCIDENCE OF PLANTAR WARTS. (Ger.) Benz, U. (Dermatologische Klinik, Universitaet Zurich, Kantonsspital, Gloriastrasse 31, CH-8091 Zurich, Switzerland); Gilliet, F. *Schweiz Med Wochenschr* 106(20): 666-671; 1976.

A statistical assay of the increasing incidence of plantar warts in 10- to 12-yr-old schoolchildren, most of them from a single community, was developed. In one year, 208 of 781 pupils of both sexes were involved, a significant elevation above the 19 children affected among 393 heterogeneous controls from scattered communities. Females were more frequently implicated in both groups, but the difference was pronounced only in the experimental group. Abnormally heavy sweating of the feet was significantly related to wart formation in both groups. However, the wearing of nylon stockings or rubber boots had no statistical effect, as did the use of public swimming facilities; foot hygiene was also not a factor. There was a positive family history of warts among the experimental pupils. Since wart proliferation was not found after summer-long barefoot exposure, it is assumed that a thicker, drier horny layer confers some protection against the stigma. (17 references)

5881 CANCER IN THE IMMUNOSUPPRESSED PATIENT. (Eng.) Najarian, J. S.; Matas, A. J. *In: Advances in Cancer Surgery.* Najarian, J. S.; Delaney, J. P., eds. (New York: Stratton Intercontinental Medical Book Corp.): pp. 127-133; 1976.

The occurrence of cancer in immunosuppressed patients is reviewed. Among two groups of immunosuppressed allograft recipients, there was a significant increase in cancer incidence; approx 75% of the tumors in both groups were lymphoproliferative tumors or carcinomas of the skin or cervix. CNS involvement by the lymphoproliferative tumors occurred in 46% of these patients, as opposed to 0.5%-1.5% of the general population. Although patients with autoimmune disease are frequently treated with drugs similar to those used in transplant recipients, there is no evidence of an increased incidence of malignancy in these patients. A significant increase in tumor incidence was noted in a series of 646 uremic patients, although the tumor types were similar to those observed in the general population. Patients with primary immunodeficiency disease appear to have a hundredfold increased risk of developing malignancy; the lymphoproliferative tumors in these patients resemble those in transplant recipients. Evidence indicates that the increased risk of cancer in immunosuppressed patients is not due solely to decreased immunosurveillance. Chronic antigenic stimulation in association with herpesvirus infection may be a contributing factor. (15 references)

5882 STUDIES ON THE EPIDEMIOLOGY OF MALIGNANT TUMORS, SYSTEMIC DISEASES AND LEUKEMIA IN CHILDREN. (Ger.) Aurich, G. (Universitaetskinderklinik des Bereiches Medizin, Friedrich-Schiller-Universitaet, DDR-69 Jena, Kochstr. 2, East Germany); Fuchs, D.; Herold, H. J.; Plenert, W.; Zintl, F. *Arch Geschwulstforsch* 46(2): 116-128; 1976.

An etiological and epidemiological review of pediatric cancer mortality and morbidity for the preceding two decades in East Germany is presented. Approximately 280 children (160 boys, 120 girls) under 15 yr of age, or about 10-11 per 100,000 of the pediatric population, annually die from malignant tumors. Most were 5-15 yr of age. Traditionally, leukemias constitute one-third to one-fourth of the malignancies, or about 3 per 100,000 children. From 1961 to 1972 the incidence of leukemia relative to all pediatric tumors was 28% for males and 27% for females. In the latest review period, 1968-1973, acute lymphocytic leukemia constituted 77%, acute granulocytic leukemia 19%, and chronic granulocytic leukemia 3% of all leukemias reported in children 16 yr or younger. Monocytic, eosinophilic, and erythroleukemias made up 1%. The sex distribution was 455 males and 323 females. Of 480 leukemic children studied, only 44 had positive family histories of malignancy, a 10:1 ratio; grandparents were involved in 38 and parents in only 3. There were 166 cases of direct contact with small animals out of 514 patients interviewed. A history of more than five infections annually could be identified in only 142 of 527 children with acute lymphocytic leukemia. Trisomy-21 was reported in 14 acute lymphocytic cases, 1 acute granulocytic leukemia, and 1 reticulum cell sarcoma. Only 6/527 leukemic cases involved maternal radiological exposure. One of 537 was diabetic; 19/508 received hormone therapy (prednisone, turinabol, nerobol, delphicort, estrogens, progesterone), only 1 of which was for management of anemia and agranulocytosis. There is no real evidence that childhood leukemia is increasing or that any single factor, or combination of factors, is causally responsible. (43 references)

5883 EPIDEMIOLOGY OF DISEASES IN ADULT MALES WITH LEUKEMIA. (Eng.) Gibson, R. (Dept. Behavioral Sciences, Sch. Medicine, Univ. Minnesota, Duluth MN 55812); Graham, S.; Lilienfeld, A.; Schuman, L.; Levin, M.; Swanson, M. *J Natl Cancer Inst* 56(5): 891-898; 1976.

The relationships suggested by clinical and laboratory observations of possible biologic links between leukemia and other diseases were examined by comparing prediagnosis case histories from the Tri-State Leukemia Survey with those of controls. Patients who were diagnosed as having leukemia who died from leukemia between 1959 and 1962 in 26 upstate New York counties and counties in metropolitan areas of Baltimore and Minneapolis, St. Paul, were included in the study. The history of disease in 605 adult male leukemia cases 15 yr and older and in 668 adult male population controls was examined. These diseases occurred at least 1 yr before leukemia was diagnosed. Of 30 diseases studied, 7 showed an excess among th patients with leukemia: infectious hepatitis, ecze psoriasis, diabetes, arthritis and rheumatism, hea disease, and ankylosing spondylitis. Mumps had a lower reported occurrence among the cases, whereas pneumonia was less frequent in acute lymphatic cas than in population controls. Three diseases occurr significantly less in controls than in persons wit specific histologic types of leukemia: herpes zost (chronic lymphatic leukemia), hives (acute and chr myeloid leukemia), and meningitis (acute myeloid l kemia). More patients admitted having had acne tha did controls. Childhood viral diseases, infectious mononucleosis, smallpox, typhoid fever, dysentery, scarlet fever, tuberculosis, asthma, hay fever, an goiter did not occur more frequently in cases than in controls. The findings were consistent with evi dence from previous studies. The increased occurre of infectious hepatitis is consistent with the fin ings of other studies showing an increased frequen of Australia antigen in patients with hepatitis, l kemia, and Down's syndrome. (36 references)

5884 CELL KINETIC ASPECTS OF LEUKEMIA CELLS I ACUTE LYMPHATIC LEUKEMIA (ALL) AND IN ACUTE MYELOID LEUKEMIA (AML). (Dut.) Bakkeren, J. J. M. (Nijmegen, The Netherlands); Hillen, H. F. P de Vaan, G. A. M. *Ned Tijdschr Geneeskd* 120(15): 678-679; 1976.

The lymphocyte stimulation test was used to study the immunological properties of leukemic cells in untreated patients with acute leukemia. In this test, the rate of incorporation of ^{3}H-thymidine in cellular DNA is measured during the in vitro stimu tion of peripheral blood lymphocytes by phytohemag glutinin (PHA). Patients with acute myeloid leukem (AML) had a high rate of incorporation in contrast to patients with acute lymphatic leukemia (ALL). T test concluded with a 3-day study of cell distribu tion in the G1 phase (premitotic rest), S phase (DNA synthesis), G2 phase (postmitotic rest), and the M phase (mitosis) by impulse cytophotometry. Thymidine incorporation rates in AML cells were 25% in the S phase and 5% in the G2 + M phases; the corresponding rates in ALL cells were 10% and 2%. Normal cells showed less than 1% incorporatio in these phases. The differences in cell prolifer tion and thymidine incorporation may be useful in the differential diagnosis of AML and ALL.

5885 STUDIES ON THE GROWTH RATE OF SPONTANEO MAMMARY CARCINOMAS IN C_3H INBRED MICE. (Ger.) Magdon, E. (Zentralinstitut fuer Krebsforschung der AdW der DDR, DDR-1115 Berlin-Buch, Lindenberger Weg 80, East Germany) Winterfield, G. A *Geschwulstforsch* 45(8): 782-794; 1975.

The incidence of spontaneous mammary cancer in 65 C_3H-He inbred mice was measured as a function of and time, and a typology of the growth rates was established. The diet included standard mouse biscuits and water ad libitum. There were 383 sponta ous neoplasms, all of which were identified withi

o as adenocarcinomas. The mean time-to-tumor was
o. Onset of the earliest tumors occurred at 5-6
f age in two animals; onset of the latest tumors
at 22 mo. An incidence of 50% was reached at 14
f age. The number of tumor-free mice totaled
and their mean survival time was 12 mo. With
ect to tumor-free mice who had reached the mean
r age, tumor incidence rose to 87%. The mean age
re tumor onset in 48 mice with one litter was
oximately 16 mo; 150 multiparous animals with
to eight litters had decreasing times-to-tumor,
hly proportional to litter number, from 15 to 13
When tumor volume increase was matched against
of measurement in 60 mice, seven different
th curves emerged. The different slopes were
pendent of cell cycling (or, volume doubling
) but related to deviations in growth fraction,
roportion of proliferating cells. (15 references)

PEDIATRIC ORBITAL RHABDOMYOSARCOMA. CLINICO-PATHOLOGICAL STUDY OF 7 CASES. (Ger.)
ahr, P. (Universitaetskinderklinik, D-6500 Mainz,
enbeckstr., West Germany); Leder, L.-D.; Mueller-
elink, H.-K.; Nover, A. *Albrecht von Graefes*
Klin Ophthalmol 196(2): 113-126; 1975.

CADMIUM CONTENT IN THE HUMAN PLACENTA.
(Ger.) Thuerauf, J. (Institut fuer Arbeits-
Sozialmedizin, D-8520 Erlangen, Schillerstrasse
9, West Germany); Schaller, K.-H.; Engelhardt,
Gossler, K. *Int Arch Occup Environ Hlth* 36(1):
7; 1975.

BASAL CELL TUMORS IN DOGS. (Eng.) Strafuss,
A. C. (Dept. Pathology, Kansas Agricultural
riment Station, Coll. Veterinary Medicine, Kan-
State Univ., Manhattan, KS 66506). *J Am Vet Med*
169(3): 322-324; 1976.

ETIOLOGY OF CHILDHOOD BONE CANCER: EPIDEMIOLOGIC OBSERVATIONS. (Eng.) Miller, R. W.
VIth International Symposium of the Society for
atting Cancer in Nordrhein-Westphalia, Dusseldorf,
8 October 1974. Swiss League Against Cancer.
lin, West Germany; Springer-Verlag): vol. 54:
2; 1976.

INCIDENCE OF ORAL LEUCOPLAKIAS AMONG 20,358 INDIAN VILLAGERS IN A 7-YEAR PERIOD. (Eng.)
a, F. S. (Basic Dental Res. Unit, Tata Inst.
amental Res., Bombay, India); Pindborg, J. J.;
sle, R. B.; Sinor, P. N. *J Cancer* 3[illegible](5): 549-
1976.

TUMOR FREQUENCY IN AUTOPSY CASES. III. CARCINOMA OF THE LUNG. (Ger.) Ruediger,
(Medizinische Akademie Erfurt, 50 Erfurt,
aeuserstrasse 74, East Germany); Guethert, H.;
el, W.; Korth, M. *Zentralbl Allg Pathol* 119(5):
377; 1975.

5892 DIET AND DISEASES OF THE COLON (Letter to Editor). (Eng.) Thompson, T. F. (La Paz, Bolivia). *JAMA* 235(26): 2815; 1976.

5893 HYPERNEPHROID CARCINOMA AND CARCINOMAS OF THE URINARY TRACT FOLLOWING PHENACETIN ABUSE. (Ger.) Kueng, L. G. (Institut fuer Pathologische Anatomie, Universitaet Zurich, Nordstrasse 358, CH-8037 Zurich, Switzerland). *Schweiz Med Wochenschr* 106(2): 47-51; 1976.

5894 CLINICOEPIDEMIOLOGIC ASPECTS AND ASSOCIATION OF GENITAL HERPES AND CERVICAL NEOPLASIA. (Eng.) Nahmias, A. J. (Div. Infectious Diseases and Immunology, Dept. Pediatrics, Emory Univ. Sch. Medicine, Atlanta, GA); Kawana, T.; Del Buono, I. *Adv Pathobiol* 5: 42-53; 1975.

5895 OCCURRENCE OF SPONTANEOUS TUMORS IN THE RAT STRAIN CHBB:THOM (SPF). (Ger.) Tilov, T. (Abt. Exp. Pathologie und Toxikologie, Fa. C. H. Boehringer Sohn, 6507 Ingelheim/Rhein, West Germany); Koellmer, H.; Weisse, I.; Stoetzer, H. *Arneim Forsch* 26(1): 45-50; 1976.

5896 EPIDEMIOLOGY OF ENVIRONMENTAL POLLUTION: DRINKING WATER IN RELATION TO CANCER AND HEART DISEASE (Meeting Abstract). (Eng.) Buncher, C. R. (Univ. Cincinnati Medical Coll., Cincinnati, OH 45267); Kuzma, R. J.; Forcade, C. M. *Am J Epidemiol* 104(3): 358-359; 1976.

5897 WATER-BORNE CARCINOGENS AND CANCER MORTALITY (Meeting Abstract). (Eng.) Mason, T. J. (NCI, Bethesda, MD 20014); Hoover, R. *Am J Epidemiol* 104(3): 341-342; 1976.

5898 CELL CYCLE ANALYSIS BY TAGGING EARLY S OR EARLY G-2CELLS: cAMP INVOLVEMENT IN G-2 OF HELA CELLS (Meeting Abstract). (Eng.) Kurz, J. B. (Dept. Molecular Biology, Vanderbilt Univ., Nashville, TN 37235); Friedman, D. L. *J Cell Biol* 67 (2/Part 2): 229a; 1975.

5899 CYTOKINETIC ANALYSIS OF ASCITES TUMOR GROWTH. (Eng.) Andreeff, M.; Opetz, W.; Gruner, B. *In: Molecular Base of Malignancy: New Clinical and Therapeutic Evidence.* Deutsch, E.; Moser, K.; Rainer, H.; Stacher, A., eds. (Stuttgart: Georg Thieme Publishers): pp. 147-153; 1976.

5900 A DEDUCTIVE APPROACH TO THE ANALYSIS OF THE GROWTH OF ASCITES TUMOR CELL POPULATIONS. (Eng.) Jansson, B. (M. D. Anderson Hosp. and

Tumor Inst., Houston, TX); Revesz, L. *Methods Cancer Res* 13: 227-290; 1976.

5901 LOW FIBER CONTENT OF CONNECTICUT DIETS. (Eng.) Dorfman, S. H. (Norwalk Hosp., Norwalk, CN 06856); Ali, M.; Floch*, M. H. *Am J Clin Nutr* 29(1): 87-89; 1976.

See also:

* (Rev): 5413, 5415, 5431, 5433, 5441, 545
5459, 5460, 5461, 5463, 5464, 548
5485, 5488, 5489, 5492, 5499, 551
5525, 5535, 5536, 5537, 5538, 553
5541, 5542, 5543
* (Chem): 5549, 5558, 5593, 5605
* (Viral): 5649, 5665, 5681, 5688, 5690
* (Path): 5779, 5784, 5789, 5790, 5812

2 CYTOCHEMISTRY OF LEUKOCYTES IN CHILDHOOD.
IV. USE OF CYTOCHEMICAL INVESTIGATIONS IN
FERENTIATION AND PROGNOSTIC ASSESSMENT OF ACUTE
KEMIAS. (Ger.) Kruse, H. (Universitaets-Kinder-
nik Rostock, DDR-25 Rostock, Rembrandtstrasse
17, East Germany). *Folia Haematol (Lepiz)* 102(4):
-402; 1975.

histochemical differentiation of leukemic cells
the beginning of therapy was explored in bone
row smears from 63 affected children ranging in
from a few months to 14 yr of age. An immature
aleukoblastic leukemia was found in 52 cases;
se cases could be subdivided cytochemically into
sphatase (acid), esterase PAS-positive (lympho-
stic), and undifferentiated types, each with its
morphological differences and remission sched-
. The remission rate was highest (100%) in the
-positive type. Chemotherapy could cause shifts
the enzymatic types. (44 references)

3 PROGNOSTIC VALUE OF CYTOKINETIC STUDIES IN
ADULT ACUTE LEUKEMIA. (Eng.) Vincent, P.
(Medical Res. Dept., Kanematsu Memorial Inst.,
ney Hosp., Sydney 2000, Australia); Gunz, F. W.;
i, J. A.; Crossen, P. E.; Singh, S. *Adv Biosci*
345-359; 1975.

okinetic findings from studies of 51 adults with
te nonlymphoblastic leukemia who were given hy-
xyurea 96 hr before other chemotherapy on a total
57 occasions are presented. Hydroxyurea was given
two doses, 24 hr apart; in 24 courses each dose
3 g/m^2 and in 33 courses it was 6 g/m^2. Serial
e marrow aspirates were obtained before and
er hydroxyurea therapy in 21 patients and before
rapy in 1 patient. ^{3}H-thymidine labeling indices
e determined by autoradiography following incuba-
of marrow samples in vitro. Hydroxyurea caused
rompt, exponential fall in the blast count after
of 52 courses given when blasts were initially
ent in the blood; the median half-time was 23
Patients who failed to show such a fall tended
lo badly, but the occurrence of a fall per se did
indicate that a patient would respond to subse-
t treatment. Evidence of at least partial syn-
nization of leukemic cell division following
roxyurea was observed in about 47% of the patients,
these tended to do better than those in whom no
t was detected. Data on DNA distribution in
e blasts revealed that nearly half of the pa-
ts had significant numbers of cells (with a DNA
ent between 2C and 4C) that failed to incorporate
hymidine. Estimates of the number of cells in S
d on the distribution of DNA were compared with
mates based on the ^{3}H-thymidine labeling index.
DNA estimate was more than twice the ^{3}H-thymidine
mate in nine patients because of the presence of
beled cells in each case. The remission rate in
e nine patients appeared to be less than in
ents showing similar values for the two estimates.
oxyurea did not appear to simply stop the delivery
eukemic cells from the marrow to the blood,
e only in a few patients did the blast count
at the same rate as that after the infusion of
autologous labeled cells. Patients in whom this happened tended to do badly. (16 references)

5904 ISOLATION OF MITOTIC ACTIVE FACTORS FROM AN ORGANISM WITH NATURALLY SYNCHRONOUS NUCLEAR DIVISIONS. (Eng.) Blessing, J. *In: Molecular Base of Malignancy. New Clinical and Therapeutic Evidence.* Deutsch, E.; Moser, K.; Rainer, H.; Stacher, A., eds. (Stuttgart: Georg Thieme Publishers): 139-141; 1976.

An experimental approach to the isolation of mitotic factors from *Physarum polycephalum* is described. Cell-free extracts of early S-phase plasmodia are low in or free of mitotically active factors, and antiserum prepared against early S plasmodial antigens should not contain antibodies against such factors. Anti-early S antibodies were incubated with cell-free extracts from plasmodia from late G$_2$-phase, and the effects of the supernatants on onset of mitosis were examined. In receptor plasmodia, mitosis was advanced 10 min by untreated and antibody treated early S-extracts, and 40 min and 65 min by untreated and antibody treated late G$_2$-extracts, respectively. Thus, anti-S antibody treated extracts of late G$_2$-phase accelerate mitosis to a greater extent than untreated cell-free extracts from the same phase. (3 references)

5905 SPONTANEOUS TRANSFORMATION OF STROMAL FIBROBLASTS DERIVED FROM HUMAN LUNG CANCERS. (Eng.) Azzarone, B. (Inst. Medical Microbiology, Univ. Genoa, Genoa, Italy); Pedulla, D. *Adv Tumour Prev Detect Charact* 3: 149-155; 1976.

The in vitro behavior of stromal fibroblasts derived from human lung cancers was studied. Skin biopsies from three patients with lung cancer were obtained from the edge of the surgical wound; skin, kidney, and lung biopsies were obtained from nonneoplastic patients for comparison. At the time of biopsy, the patients had received no chemotherapy or radiotherapy. Cultures were fed with Eagle's minimum essential medium supplemented with 10% fetal calf serum, penicillin (100 IU/ml), streptomycin (100 µm/ml), and Fungizone (2.5 µg/ml). The medium was also enriched with nonessential amino acids and glutamine (0.3 mg/ml). When confluent cells were subcultured by a 1:2 split, EDTA-trypsin solution was used throughout. At every subculture, sister cultures were maintained in crowded culture conditions with daily replacement of the medium. All of the fibroblastic strains derived from lung tumors underwent a spontaneous transformation, suggesting that these cells were in a preneoplastic state. Strains derived from nonneoplastic patients proceeded to the declining stage and did not transform. Genetic data from a karyologic analysis of the cells from neoplastic patients confirmed that the spontaneous transformation of the fibroblasts was not a chance phenomenon. The disappearance of the tumor cells after primary culture (due to trypsinization) and their inability to propagate or survive over 3 wk suggest that this type of environment is unfavorable for tumor cells. (21 references)

5906 **CALCITONIN IN SPINDLE CELL THYMIC CARCINOID TUMORS (Letter to Editor).** (Eng.) DeLellis, R. A. (Boston, MA); Wolfe, H. J. *Arch Pathol Lab Med* 100: 340; 1976.

The unlabeled antibody bridge immunoperoxidase technique was used to determine the presence of calcitonin in two spindle cell variants of thymic carcinoid tumors. One of the tumors revealed a finely granular brown reaction product limited to the cytoplasm of the tumor cells when they were incubated with calcitonin antiserum. The other tumor showed no specific staining with the antiserum. The results clearly demonstrated the presence of calcitonin in one case; however, the source of the tumor could not be determined. (2 references)

5907 **MALIGNANCY AND SH-COMPOUNDS.** (Eng.) Schauenstein, E.; Schindler, R. *In: Molecular Base of Malignancy: New Clinical and Therapeutic Evidence.* Deutsch, E.; Moser, K.; Rainer, H.; Stacher, A., eds. (Stuttgart: Georg Thieme Publishers): pp. 55-59; 1976.

The functional importance to malignancy of low-molecular nonprotein thiols (NPSH) and the SH groups of all the soluble cell proteins (PSHL) were investigated. The NPSH and PSHL contents in the livers of Sprague-Dawley rats before and during feeding with diethylnitrosamine were determined with Ellman's reagent. A mean value of 5.07 μM of NPSH/g wet wt was found in healthy rat livers. At 63 to 65 days after administration of the carcinogen, the livers showed a grained surface, and NPSH had increased to 6.99 μM. Massive tumor formation occurred at 112 to 122 days, and NAPSH increased to 9.82 μM. There were no significant variations in PSHL. The SH content (μmoles SH/mg protein) of the soluble proteins increased linearly with decreasing doubling time (td, from 2 to 10 days) in the 11 fast-growing tumors studied. Tumor cells and slices of tumors incubated 30 min at 37 C in 5×10^{-3} M 4-hydroxy-2,3-pentenl-al, a highly selective SH inhibitor, resulted in a loss of protein SH that increased linearly with decreasing td in the tumors. It is concluded that among the SH groups of tumor soluble cell proteins there exist certain thiols the number of which is correlated to the td through an exponential function, indicating the functional importance of these thiols for tumor growth. The findings point to a protective effect of NPSH for PSHL from the attack of an SH inhibitor. This effect may be looked upon as a general model for the protecting effect of low-molecule thiols against SH reagents and possibly the well-known protective effect against radiation in living cells. (13 references)

5908 **CHARACTERIZATION OF THE MEMBRANE MATRIX DERIVED FROM THE MICROSOMAL FRACTION OF RAT HEPATOCYTES.** (Eng.) Blackburn, G. R. (Dept.
Radiobiology, Colorado State Univ., Fort Collins, C
80521); Bornens, M.; Kasper, C. B. *Biochim Biophys
Acta* 436(2): 387-398; 1976.

The microsomal membrane matrix was characterized in
terms of chemical composition molecular wt at dis-
tribution of constituent polypeptides, separation
into molecular wt classes by Sephadex gel filtratic
and amino acid composition of individual fractions.
A highly purified membrane preparation from the
microsomal fraction of rat hepatocytes was chemical
characterized and fractionated by gel filtration. T
preparation, freed of ribosomes and intravesicular
protein is composed, on a wt/wt basis, of 52.1% pr
tein, 45.0% phospholipid, 2.9% carbohydrate, and n
RNA; 97% of the total membrane phosphorus was phos-
pholipid phosphorus. Determination of the molecula
wt distribution of the constituent polypeptides by
sodium dodecyl sulfate-polyacrylamide gel electrop
esis gave values ranging from 171,000 to 16,000 fo
the major classes of proteins. Although several me
brane glycoproteins were identified, the most prom
nent species has an apparent molecular wt of 171,0
40% of the total microsomal protein was present in
49,000 to 60,000 molecular wt region. The intrinsi
polypeptide composition of membranes obtained from
smooth and degranulated rough endoplasmic reticulu
revealed no detectable qualitative differences.
Sodium dodecyl sulfate-solubilized microsomal mem-
brane proteins were separated by gel filtration in
simplified molecular wt classes, some of which sho
predominantly a single electrophoretic component.
Amino acid analysis of individual fractions showed
noticeable trend toward a decreasing ratio of acid
to basic residues with decreasing molecular wt.
Membrane phosphorus was distributed between two
chromatographic fractions: one containing the mem-
brane phospholipid (97%) as well as essentially al
the cholesterol, and the other, at the inclusion
volume of the gel filtration system, containing
small molecular wt species (3%). The absence of a
ribonuclease-resistant RNA component eluting near
the void volume clearly distinguished the microson
membrane from the nuclear envelope. (60 references

5909 **INTERACTIONS BETWEEN CONCANAVALIN A AND
ITS CELL-SURFACE RECEPTORS: ULTRASTRUCT
STUDY.** (Eng.) Huet, Chr. (Institut de Recherches
Scientifiques sur le Cancer, B.P. 8, 94800 Villej
France); Pedron, J. *J Microscop Biol Cellul* 23(3)
213-228; 1975.

The lectin concanavalin A (Con A) was used to mar
the carbohydrates of cell surface glycoproteins f
12-day-old hamster embryos. It was detected by pe
oxidase (PO) or immuno-enzymatic techniques. Afte
incubation of the cells with Con A and then reinc
tion without the lectin at 37 C, the compound was
longer detected by PO, but some molecules could b
detected on the cell surface with anti-Con A anti
sera (goat origin). Double labeling with Con A di
not show modulation mechanisms in the surface, bu
rather a falling off of Con A molecules from the
receptor sites. Double incubation with Con A fol-

ed by PO labeling showed that the second incuba-
 with the lectin made it possible to relabel the
es from which it had fallen off. The detection of
 lectin by PO on agglutinated cells confirms the
othesis of a lectin bridge formed between the
oranes of adjacent cells. The use of inhibitor
ars (methylmannoside, mannose, glucose, and cel-
lose) did not provide additional information on
 nature of PO-positive lectin receptor sites. (36
erences)

COMPARISON OF MAJOR SURFACE PROTEINS OF LEUKEMIC AND NORMAL LYMPHOCYTES. (Eng.)
es, R. E.; Morrison, M. *In: Cell Surfaces and*
gnancy. John E. Fogarty International Center for
nced Study in Health Sciences and Natl. Insts.
lth (Bethesda, MD: September 11-13, 1974): pp.
-247; 1975.

 surface proteins of human leukemic lymphoblasts
 compared with human normal lymphocytes by double
eling. Lymphocytes were isolated from normal
n peripheral blood by a method that yields only
mphocytes. Malignant lymphoblasts (CCRF-CEM)
inally isolated from a patient with acute leu-
a secondary to a lymphosarcoma were grown in
ner cultures. The surface components on both
s were labeled identically by lactoperoxidase-
lyzed iodination, except that the two samples
 labeled with different isotopes of iodine, ^{125}I
^{31}I. The samples were solubilized and mixed, and
 proteins were separated by electrophoresis on
same gel. The gel was sliced laterally, and the
nt of isotope in the slices was determined with
uble channel gamma spectrometer. This approach
seful for resolving small differences between
led peptides because all differences due to
le preparation, gel electrophoresis, or gel
ing are eliminated. The leukemic lymphoblasts
a relatively decreased amount of labeled sialyl
oprotein on their surfaces compared to normal
hocytes. Normal lymphocytes are stimulated to
de by agents that cross-link a sialyl glycopro-
 on their surfaces; this leads to the suggestion
 the continued proliferation of leukemic lympho-
ts may be directly linked to an alteration ob-
ed in the sialyl glycoprotein. (33 references)

TRANSPORT OF NUCLEOSIDES. (Eng.) Paterson,
A. R. P. (Univ. Alberta Cancer Res. Unit,
nton, Alberta, Canada T6G H7); Kim, S. C.; Ber-
, O.; Cass, C. E. *Ann NY Acad Sci* 255: 402-411;
.

ges in the activity of the thymidine transport
anism during the HeLa cell cycle were investi-
d. Nitrobenzylthioinosine (NBMPR) exerted an
biting effect on the transport of both thymidine
uridine, despite the fact that the transport of
 apparently proceeds by a separate mechanism.
rate components in the thymidine uptake by HeLa
 monolayers were observed, one of which is satur-
 and represents a mediated uptake. NBMPR (1 μM) eliminated the saturable component, and the rate of the remaining component was found to be directly proportional to concentration, indicating entry by simple diffusion. Experiments with HeLa cells pretreated with 0.01 μM NBMPR, washed, and assayed for thymidine uptake revealed that NBMPR is a potent inhibitor of thymidine uptake and is firmly bound to the transport mechanism. Studies of the time course of thymidine uptake in G$_1$ cells showed that the cellular content of thymidine acquired during rapid uptake was directly proportional to thymidine concentration and was only partially inhibited by NBMPR, suggesting that this uptake was largely due to a physicochemical process such as adsorption. These results indicated that the mediated uptake of thymidine in G$_1$ cells occurred at low rates only. In contrast, the uptake of thymidine in S phase cultures progressed linearly with time at rates much in excess of those seen in G$_1$ cells. The thymidine transport mechanism of HeLa cells appears to be activated, or added to the plasma membrane, during the progression from G$_1$ to mid-S. However, further experiments are necessary to distinguish between the transport and kinase components of thymidine uptake. (40 references)

5912 THE BINDING OF CYCLIC NUCLEOTIDES OF MEMBRANES OF THE ENDOPLASMIC RETICULUM OF NORMAL AND NEOPLASTIC RAT LIVER. (Eng.) Sharma, R. R. (Dept. Biochemistry, Univ. Tennessee Health Center, Memphis, TN 38163); McLaughlin, C. A.; Pitot, H. C. *Arch Biochem Biophys* 175(1): 221-228; 1976.

Cyclic nucleotide binding to endoplasmic reticulum was studied in normal and neoplastic liver tissue from male albino Sprague-Dawley and Buffalo rats. In contrast to normal liver, which has only a single binding site for cyclic AMP on membranes of the endoplasmic reticulum, cyclic AMP binding to the intracellular membranes of hepatoma 5123C and 7777 exhibited two apparent binding sites. The binding constant for cyclic AMP of one site on the tumor membranes was comparable to that of the normal liver, whereas the value of the second intrinsic association constant was 4 to 40 times greater than liver. The possibility that the second cyclic AMP binding site might be a function of the rapid tumor growth was unlikely, since membrane preparations from neonatal rats showed a single affinity association constant that was similar to that of normal liver. In addition, membranes of the endoplasmic reticulum of the Morris hepatomas 5123C and 7777 exhibited a binding site for cyclic GMP that is absent from the intracellular membranes of liver. (39 references)

5913 PROTEIN PHOSPHORYLATION OF THE SMOOTH AND ROUGH ENDOPLASMIC RETICULUM IN NORMAL AND NEOPLASTIC LIVER OF THE RAT. (Eng.) Sharma, R. K. (Univ. Tennessee Medical Center, Memphis, TN 38104); McLaughlin, C. A.; Pitot, H. C. *Eur J Biochem* 65(2): 577-586; 1976.

The protein kinase activities of microsomal membranes from normal and neoplastic liver were examined, compared and correlated with cyclic nucleotide binding activities. Smooth and rough endoplasmic reticulum from rat livers and Morris hepatomas exhibited endogenous protein kinase activity independent of AMP. The endogenous phosphorylation of smooth membranes was at least twice as high as that of the rough membranes. When histone was added along with the smooth endoplasmic reticulum, cyclic AMP stimulated protein phosphorylation. Analysis of membrane-phosphorylated proteins by gel electrophoresis showed five major bands having estimated molecular wt of 155,000, 62,000, 50,000, 46,000, and 43,000, whereas only three major phosphorylated bands with estimated molecular wt of 62,000, 50,000, and 43,000 were found in membranes of the smooth endoplasmic reticulum of Morris hepatoma 5123C. Since previous studies have demonstrated the similarity of the protein components of membranes of the endoplasmic reticulum of normal liver and hepatoma, these findings indicate an inability of the protein kinase of hepatoma intracellular membranes to phosphorylate protein species found in membranes of both the liver and the neoplasm. (29 references)

5914 A PLASMOCYTOMA RIBOSOME-ASSOCIATED PROTEIN KINASE WHICH PHOSPHORYLATES A SPECIFIC PROTEIN OF THE RIBOSOMAL KCL WASH. (Eng.) Quirin-Stricker, C. (Centre de Neurochimie du C.N.R.S., Institut de Chimie Biologique, Faculte de Medicine de l'Universite Louis-Pasteur, 11 Rue Humann, F-67085 Strasbourg-Cedex, France); Schmitt, M.; Egly, J.-M.; Kempf, J. *Eur J Biochem* 62(1): 199-209; 1976.

One ribosomal protein kinase activity and three soluble protein kinase activities were identified in plasma cell tumors by DEAE-cellulose chromatography. The ribosomal protein kinase was found to be an Mg^{2+}-dependent enzyme that transfers the γ-phosphate from ATP into phosphoseryl and phosphothreonyl residues of the substrate. Like the soluble protein kinases it catalyzed the phosphorylation of several proteins like histone, phosvitin, casein, and ribosomal proteins, but it differs from the main soluble kinases by the fact that it catalyzed specifically the phosphorylation at least of one ribosomal KCl wash protein. This protein had a molecular wt of approx 90,000 and was released from ribosomes under conditions commonly employed for the extraction of initiation factors. The ribosome-associated protein kinase was not stimulated by the addition of cyclic AMP. KCl had no effect and NaCl had a weak effect on the phosphorylation. Mn^{2+} and Ca^{2+} were inhibitors. ADP was a competitive inhibitor. The maximum velocity of the ribosomal protein kinase-catalyzed reaction was 0.65 nmol of ^{32}P incorporated in the KCl wash protein per minute and per milligram of protein. The Km for the ribosomal KCl wash protein as substrate was 0.71 mg/ml and the Km for ATP was 94 μM. The molecular wt of the ribosomal protein kinase, estimated by electrophoresis in polyacrylamide-dodecylsulfate gels, was 60,000 and probably corresponded to a catalytic subunit. (25 references)

5915 ADENYLATE CYCLASE AND PROTEIN PHOSPHOKIN ACTIVITIES IN HUMAN THYROID. COMPARISON NORMAL GLANDS, HYPERFUNCTIONAL NODULES AND CARCINOMAS. (Eng.) Sand, G. (Institut de Recherche Inte disciplinaire, Faculte de Medecine, Universite de Bruxelles, B-1000 Bruxelles, Belgium); Jortay, A.; Pochet, R.; Dumont, J. E. *Eur J Cancer* 12(6): 447-453; 1976.

Basal and stimulated adenylate cyclase and protein phosphokinase activities were measured in seven specimens of thyroid carcinomas (two papillary, tw mixed papillofollicular or trabecular, one follicu and two medullary), and six hyperfunctional autonomous nodules. Nine specimens of normal tissue fro the opposite lobe of the nodular thyroids and from normal glands constituted the control group. Adeny cyclase: basal activity and stimulation by thyrotropin were similar in all cases. Hyperfunctional nodules were characterized by a significant increa of stimulation, compared to normal, by sodium fluo (13.0- vs. 7.8-fold) and prostaglandin E_1 (2.6- vs 1.3-fold). Adrenalin had no significant effect. Protein phosphokinase: basal activity was up to four-fold higher in carcinomas. Activation by cycl AMP was similar in normal and pathological homogenates. These data show that adenylate cyclase activity is not unequivocally related to the degree malignancy in human thyroid tumors and that protei phosphokinase activity is increased in such tissue The data are discussed with relation to studies of transformed cells in vitro. (19 references)

5916 CONTROL OF RIBONUCLEOTIDE REDUCTASE IN MAMMALIAN CELLS. (Eng.) Cory, J. G. (Dep Biochemistry, Univ. South Florida Coll. Medicine, Tampa, FL 33620); Mansell, M. M.; Whitford, T. W. *Adv Enzyme Regul* 14: 45-62; 1976.

The ribonucleotide reductase system from Ehrlich ascites tumor cells was studied. The ratio of cyto sine diphosphate (CDP) to ADP reductase activities did not remain constant during purification. The A reductase activity was more sensitive to dimethylformamide (DMF) and dimethylsulfoxide (DMSO) than was CDP reductase activity. The CDP reductase activity was more sensitive to inhibition by the dia dehyde derivatives of adenosine, inosine, purine riboside, 6-N-methyladenosine and AMP than was ADP reduction. Pyridoxal phosphate/borohydride treatme caused a marked alteration in the ratio of CDP/ADP reductase activities. The optimal Mg^{+2} ion concent tion for CDP, UDP, and ADP reductase activities we 3-4, 0.4, and 0.1 mM, respectively. The modular effects of the nucleoside triphosphates were compa for CDP and ADP reductase activities. ATP was the prime activator of CDP reduction. However, the ATP concentration required for maximum CDP reduction caused a 90% decrease in ADP reduction. The prime activator of ADP reduction was dGTP. GTP was only one-sixth as effective as dGTP in terms of maximum ADP reduction. Analysis of the GTP and dGTP levels in the tumor cells showed that the levels of dGTP were probably too low to modulate the ADP reductas in the intact cell. Further, GTP and dGTP were neg tive effectors of CDP reduction. dTTP was much mor

ibitory to CDP reductase than to ADP reductase.
level of CDP reductase increased upon incubation
the Ehrlich tumor cells in serum-free media in
ture. The increase in activity was not blocked by
loheximide or actinomycin D. There was a corre-
nding increase in the level of thymidine incorpora-
n into DNA. These data suggest that there are
er factors not related to protein or RNA synthesis
t are involved in initiating DNA synthesis. (34
erences)

7 STUDIES OF INTRACELLULAR DISTRIBUTION OF
ACID PHOSPHATASE 5 IN THE SPLEEN CELLS OF
KEMIC RETICULOENDOTHELIOSIS BY ISOPYCNIC GRADIENT
TRIFUGATION. (Eng.) Lam, K. W. (Depts. Ophthalmol-
and Biochemistry, Albany Medical Coll. of Union
v., Albany, NY 12208); Dekker, P. T.; Castleman,
Yam, L. T. *Clin Chim Acta* 70(2): 289-295; 1976.

resh spleen sample obtained from a 48-yr-old man
h leukemic reticuloendotheliosis was homogenized
centrifuged on a sucrose density gradient. A
or portion of acid phosphatase band 5 was observed
the lysosomes, confirming that the elevated phos-
tase activity in the neoplastic spleen is a lyso-
al enzyme. However, a significant amount of band
as also observed in the microsomes. The microsomal
lysosomal enzymes have a remarkably different
inity to carboxymethylcellulose. When the lyso-
al enzyme was chromatographed, two activity peaks
e observed--the activity in the beginning of the
umn contained band 3 and a small amount of band
Only band 5 was observed in the second peak. When
microsomal enzyme was chromatographed, all of
activity was observed in the beginning of the
tion, which included a prominent band 5 and band
There was no second peak. (17 references)

18 CYCLIC AMP PHOSPHODIESTERASE INHIBITORS
DEPRESS PRODUCTION OF PLASMINOGEN ACTIVATOR
CHINESE HAMSTER OVARY CELLS. (Eng.) Mott, D. M.
nst. for Cancer Res., Fox Chase Cancer Center,
iladelphia, PA 19111); Fabisch, P. H.; Sorof, S.
ochem Biophys Res Commun 70(4): 1150-1156; 1976.

cogenic transformation in some cell systems is
sociated with an increased production of extracel-
lar proteolytic activators that convert the plasma
oenzyme, plasminogen, to the active protease,
asmin. In the present study, two cyclic AMP phos-
odiesterase inhibitors (theophylline, papaverine)
rkedly depressed, by 6%-21% and 6%-12% of controls,
spectively, the production of intracellular and
tracellular plasminogen activator by Chinese ham-
er ovary cells (CHO-K1) in serum-free medium.
ostaglandin E_1 had a moderately similar effect on
e production of only extracellular plasminogen
tivator (a drop in the level of fibrinolytic ac-
vity to 42%-54% of that of controls). The ability
control experimentally the level of production of
asminogen activator should help to elucidate the
ssible biological role of the proteolytic action
plasmin on the surface of CHO cells, and the cell
surface alterations that accompany oncogenic transformation. (18 references)

5919 ALTERED GLUCOSE-6-PHOSPHATE DEHYDROGENASE IN BROMODEOXYURIDINE-SUBSTITUTED CELLS. (Eng.) Bick, M. D. (Roche Inst. Molecular Biology, Nutley, NJ 07110); Soffer, M. *Nature* 260(5554): 788-791; 1976.

Glucose-6-phosphate dehydrogenase activity in parent and bromodeoxyuridine (BUdR)-substituted cell lines was examined in order to detect BUdR-induced alterations in the genome or in transcription products. The parent line, 3460 cells, was derived from a Syrian hamster melanoma; the BUdR-substituted lines, B4 and HAB, were 62 and 99.8% substituted with BUdR, respectively. In enzyme preparations that had been adjusted to nearly equal protein concentration, G6PD activity for all three lines showed a biphasic denaturation, with both a rapidly and a slowly denaturing component. The average fraction of heat-labile G6PD molecules from four different preparations was 56.5%, 69.7% and 79.7% for3460,B4 and HAB cells, respectively. The correlation between the fraction of heat-labile G6PD and the extent of BUdR substitution suggests that BUdR may be acting as a mutagen or that these ''variants'' represent the products of transcriptional errors induced by BUdR. Two major peaks of G6PD activity were observed for all three lines on polyacrylamide disk gels with Rf of 0.22 (peak 1) and 0.28 (peak 2); the relative amounts of peaks 1 and 2 were routinely found to be 69:31, 52:43, and 28:72 for 3460, B4, and HAB cell G6PD, respectively. B4 and HAB cell G6PD had a higher Km for NADP; this plus the observed increased proportion of peak 2 activity, which was extremely heat-labile, suggests the presence of an altered population of G6PD molecules, at least some of which may have altered in their NADP binding by amino acid substitution.

5920 COOPERATIVE INTERACTIONS OF TETRAHYDROFOLATE WITH PURIFIED PIG KIDNEY SERINE TRANSHYDROXYMETHYLASE AND LOSS OF THIS COOPERATIVITY IN L1210 TUMORS AND IN TISSUES OF MICE BEARING THESE TUMORS. (Eng.) Kumar, P. M. H. (Graduate Section Biochemistry, Dept. Chemistry, Brigham Young Univ., Provo, UT 84602); North, J. A.; Mangum, J. H.; Rao, N. A. *Proc Natl Acad Sci USA* 73(6): 1950-1953; 1976.

The allosteric interactions are reported between tetrahydrofolate and serine transhydroxymethylase (5,10-methylenetetrahydrofolate:glycine hydroxymethyltransferase) purified 200-fold from pig kidneys and from homogenates of mouse livers and kidneys. The absence of these cooperative effects is noted in the enzyme obtained from L1210 solid tumors induced in the flanks of mice or from the livers and kidneys of tumor-bearing animals. Serine transhydroxymethylase showed cooperative interactions with tetrahydrofolate with a Hill coefficient (n value) of 3.9 and a substrate concentration at 50% of maximum velocity, the $S_{0.5}$ value, of enates also showed cooperative interactions with tetrahydrofolate. However, the enzyme obtained from L1210 solid tumors of mice, and from livers and kidneys of mice inoculated with L1210 cells, exhibited hyperbolic saturation kinetics and gave a Michaelis constant Km value of 0.5 mM for tetrahydrofolate. The interaction of serine with the enzyme from pig kidney, from tissues of normal or tumor-bearing mice, or from L1210 tumors was hyperbolic, with a Km of 0.9 mM. The specific activities of the enzyme in the L1210 tumor and in the mouse liver were tenfold higher than in pig or mouse kidney. There was no significant change in the levels of the enzyme in the mouse liver and kidney on inoculation with L1210 cells. These results suggest that a tumor can bring about biochemical changes in tissues remote from the tumor site. (19 references)

5921 DNA DEPENDENT RNA POLYMERASES IN HUMAN NORMAL AND LEUKEMIC WHITE BLOOD CELLS. (Eng.) Mertelsmann, R.; Garbrecht, M.; Heitbrock, H. W. *In: Molecular Base of Malignancy. New Clinical And Therapeutic Evidence.* Deutsch, E.; Moser, K.; Rainer, H.; Stacher, A., eds. (Stuttgart: Georg Thieme Publishers): pp. 25-32; 1976.

Leukemic blast cells are considered cells with an altered expression of genetic information, including acquired and/or inherited oncogenic information, that renders them less responsive to feedback mechanisms and stimuli for differentiation. In an investigation of normal and leukemic WBC the authors found that RNA polymerase B activity in all normal mononuclear cell nuclei was 12 times higher than RNA polymerase A activity. Granulocyte RNA polymerase activities were elevated in acute myeloid leukemia (AML). Mononuclear cell RNA polymerase activities in AML without therapy or AML refractory to therapy were significantly higher than normal. When AML responded to cytostatic therapy, enzyme activities approached normal values. RNA polymerase activities in chronic leukemias were subnormal, increasing under effective therapy and during remission toward normal values. The RNA polymerase B activities of normal subjects revealed a rhythmic diurnal variation, which peaked at midnight and had its nadir at 12:00 noon. The RNA polymerase B activities of chronic lymphatic leukemia lymphocytes did not exhibit a significant diurnal variation. The differences in RNA polymerase activities in normal and leukemic cells could possibly be due to varying ratios of the enzyme population unable to translate the endogenous chromatin template and that engaged in transcription. (14 references)

5922 EFFECTS OF ESTROGEN AND PROGESTERONE ON TRANSCRIPTION, CHROMATIN AND OVALBUMIN GENE EXPRESSION IN THE CHICK OVIDUCT. (Eng.) Spelsberg, T. C. (Dept. Molecular Medicine, Mayo Clinic, Rochester, MN 55901); Cox, R. F. *Biochim Biophys Acta* 435(4): 376-390; 1976.

When immature chicks treated for 14 days with estrogen were withdrawn from estrogen treatment, there was a gradual reduction in endogenous nuclear RNA polymerase activities, both nuclear (I) and nucleo plasmic (II). Diurnal variations in polymerase II activities in the oviduct of withdrawn chicks requ that subsequent experiments include time-matched controls. The hormones altered RNA polymerase I an II activities in vivo as assayed in isolated nucle Progesterone repressed the polymerase I and II activities, while estrogen alone and estrogen + prog terone enhanced both polymerase activities immediately after injection. Diethylstilbestrol caused changes similar to those of estrogen. The effects these steroids on the polymerases were detected within 15 min of hormone injection. Changes in the capacities of chromatins to serve as template for RNA synthesis in general correlated with changes i polymerase II activities. In the case of estrogen treatment, the acidic chromatin protein (but not histone) levels fluctuated positively with the tem plate capacities of the chromatin. An antagonism between estrogen and progesterone was observed in the responses of both RNA polymerases I and II activities as well as in the chromatin template capacity. Levels of messenger RNA (mRNA) coding for ovalbumin increased in oviducts of withdrawn chick within 2-3 hr of the injection of estrogen, proges terone, or estrogen + progesterone. This rapid acc ulation of ovalbumin mRNA was not accompanied in each case by a similar increase in polymerase II activity or chromatin template capacity. (57 references)

5923 THYROID HORMONES AND LYMPHOID CELLS. (En Lundell, G. (Radiumhemmet, General Dept. S-104 01 Stockholm, Sweden); Blomgren, H. *Acta Rad* [*Ther*] *(Stockh)* 14(6): 552-560; 1975.

The effect of thyroid hormones on DNA synthesis in human lymphoid cells (from healthy euthyroid indiv uals) was studied in vitro. Sodium salts of levo-triiodothyronine, levo-thyroxine, dextro-thyroxine and dextro-triiodothyronine were added to cell cul tures in a twofold dilution starting with 0.1 mg (dilution 1/1). In some cases, sodium iodide was added to the cultures in the same manner. After 4 days incubation, 0.4 μCi of ^{14}C-thymidine was adde to each culture, and 24 hr later the cultures were completed. The amount of incorporated isotope was determined by scintillation counting. In control cultures without hormones, ^{14}C-thymidine uptake increased during incubation. Both the L and D form of the hormones enhanced thymidine uptake as compa with control values. The effect was dose dependent High concentrations of NaI also enhanced DNA synthesis but to a lesser extent than the hormones. T data support the hypothesis that thyroxine causes lymphoid tissue enlargement by stimulating the div sion of lymphocytes, not by prolonging their life span. (35 references)

5924 HORMONAL REGULATION OF AMINO ACID TRANSPORT IN RAT HEPATOMA CELLS IN TISSUE CULTURE. (Eng.) Gelehrter, T. D.; Risser, W. L.; Reic berg, S. B. *In: Gene Expression and Carcinogenesis in Cultured Liver.* Gerschenson, I. E.; Thompson, E.

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role of amino acid transport in the effects of
methasone (dex) and insulin on specific and
ral protein synthesis, and the hormonal modula-
of glycine transport, were studied in rat HTC
atoma) cells. The cells were preincubated in
ction medium (lacking serum) for 18-20 hr with
ithout hormones before the transportation stud-
The uptake of α-aminoisobutyric acid (AIB) and
ine was measured. Glycine inhibited the initial
ke of AIB by 50% at a concentration 100 times
of AIB. Dex (0.1 μM) decreased the capacity of
transportation system for AIB by 50% and, after
er periods, also decreased the affinity of the
em for the substrate. Insulin (4 μg/ml) increased
transport of AIB only slightly in untreated
s; however, in cells incubated with dex for 18
nd then with dex plus insulin for 2 more hr
re AIB was added, insulin markedly stimulated
sport, restoring uptake to normal. RNA and pro-
synthesis inhibitors were also used to study
e effects. Inhibition of protein synthesis by
oheximide prevented the dex-induced decrease in
uptake; therefore, the effect of dex on AIB
sport is dependent on concomitant protein syn-
is. The effect of dex on natural amino acid
sport, another study, showed that the effect of
is general, not AIB specific. Of interest is the
ing that AIB competitively inhibits glycine
sport even in dex-treated cells in which AIB
sport is markedly inhibited. (19 references)

EFFECT OF GLUCOCORTICOIDS ON THE ULTRASTRUCTURE OF CULTURED LIVER CELLS. (Eng.)

iner, J. A. *In: Gene Expression and Carcinogen-*
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alteration of mitochondrial and outer membrane
nology by dexamethasone sodium phosphate (dex)
studied in an in vitro system using RLC-GAI rat
r cells. Cells were grown in modified Ham's
m; the concentration of dex was 10^{-5} M. Trans-
ion and scanning electron microscopy and elec-
microscopy stereology were among the techniques
. Cells cultured with dex for 5 days showed
rgement, probably due to mitochondrial lengthen-
These effects were reversible if dex was re-
d from the medium for 2 days. As a result of
finding, various drugs were tested to determine
signal for mitochondria to return to normal
. When hydroxyurea (50 μg/ml), cycloheximide
μg/ml), or chloramphenicol (10 μg/ml) were added
e to the medium, no changes were noted. However,
dium bromide (EB, 0.1 μg/ml) caused megamitochon-
l formation that appeared similar to the enlarged
chondria formed by dex treatment. When these
s were added to the 2-day reversal medium, only
nd chloramphenicol, the two known mitochondrial
bitors, blocked reversal. The effects of dex and
n DNA synthesis were evaluated by autoradiography.
nhibited cytoplasmic DNA synthesis completely,
ear synthesis only slightly; dex inhibited both
to the same degree, making it unlikely that this type of inhibition could cause mitochondria fusion. Changes in general cell shape were also monitored. Within 24 hr after addition of dex, the overall shape changed from a more bipolar to a more epithelioid form; the cells appeared to be more contact inhibited. The number of cells possessing blebs was reduced by about 50% and the portion of the total upper surface covered with projections was reduced by about 30%, compared to untreated cells. It was concluded that the signal for mitochondria to return to normal size after dex treatment is propagated through the mitochondria; it was not possible to determine this signal more specifically. (15 references)

5926 INSULIN RECEPTORS IN NORMAL AND TRANSFORMED FIBROBLASTS: RELATIONSHIP TO GROWTH AND TRANSFORMATION. (Eng.)

Thomopoulos, P. [Unite de recherche sur le metabolisme des Lipides (INSERM), Hospital Henri Mondor, Creteil, France]; Roth, J.; Lovelace, E.; Pastan, I. *Cell* 8(3): 417-423; 1976.

The insulin receptors in normal and transformed lines of mouse Balb/3T3 fibroblasts were studied. In the normal fibroblasts, the binding of insulin was low in growing cells and increased two- to ninefold in confluent stationary cells. Insulin binding was increased whether growth arrest was due to contact inhibition of growth or serum starvation. When serum-starved cells were stimulated to grow by the addition of fresh serum, insulin binding declined. In cells transformed by simian virus 40 (SV40); Kirsten, Moloney, and Harvey sarcoma viruses, methylcholanthrene, x-rays, or spontaneously, the binding was low, in the same range as growing normal cells. SV40-transformed cells, insulin binding increased fourfold as the cells reached higher densities in culture. There was no relationship to changes in cell size. The differences in binding were due to changes in the concentration of the receptors, without changes in their affinity for the hormone. The results suggest the existence of specific insulin receptors in normal and transformed mouse embryo fibroblasts. (35 references)

5927 PHYSICAL AND BIOCHEMICAL CHANGES OF RAT LIVER CHROMATIN RESULTING FROM PARTIAL HEPATECTOMY (Meeting Abstract). (Eng.)

Bakewicz, D. M. (Dept. Biology, Brooklyn Coll., City Univ. New York, Brooklyn, NY 11210); Leffak, I. M. *J Cell Biol* 67(2/Part 2): 16a; 1975.

5928 IMPAIRED mRNA BIOGENESIS IN SENESCENT HUMAN FIBROBLASTS (Meeting(Abstract).

(Eng.) Hadjiolov, A. (New York Univ. Sch. Medicine, New York, NY); Adesnik, M.; Lande, M.; Sabatini, D. *J Cell Biol* 67(2/Part 2): 151a; 1975.

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Greene, R. F. (Div. Biomedical Sciences, Brown Univ., Providence, RI); Fausto, N. *J Cell Biol* 67(2/Part 2): 145a; 1975.

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ADAMS, D. O.
5733
ADESNIK, M.
5928*
ADNET, J. J.
5782
AGEE, J. F.
5815*
AGHAI, E.
5728
AGRIS, P. F.
5989*
AHMED, M. N.
5787
ALEXANDER, C. S.
5597*
ALEXANDER, J.
5722*
ALEXANDROV, V. A.
5589
ALI, M.
5901*
ALLEN, H. J.
5958*
ALLFREY, V. G.
5990*
AMMANN, R.
5858*
ANDERSON, L. W.
5808*
ANDOH, T.
5668
ANDREEFF, M.
5899*
ANDREWS, A. D.
5639*
ANDRYS, J.
5867
ANSAH-YIADOM, R.
5975*
ANTONI, F.
5682
ANZAI, K.
5668
APPAJI RAO, N.
5981*
ARAI, M.
5578, 5591
ARAKI, K.
5803
ARCOS, J. C.
5573
ARGUS, M. F.
5573
ARGYRIS, B. F.
5738
ARIWA, R.
5625
ARNOLD, K.
5875
ARONSON, I. K.
5832*
ASAL, N. R.
5874
ASFOUR, M.
5843*
ASO, K.
5946*
ASTIER, T.
5658
ATLAS, S. A.
5571
AUGENLICHT, L.
5998*
AURICH, G.
5882
AVERY, B.
5740
AWAD, W. M.
5980*
AZZARONE, B.
5905
BADER, J. P.
5645
BAHNSON, C. B.
5544*
BAKER, S. A.
5971*
BAKEWICZ, D. M.
5927*, 5991*, 5999*
BAKKEREN, J. A.
5884
BALDA, B. R.
5718*
BALDUZZI, P. C.
5520*
BALDWIN, R. W.
5446, 5735
BALTIMORE, D.
5656
BANERJEE, M. R.
5588
BANJO, C.
5725
BANKHURST, A. D.
5753*
BARBER, T. A.
5468
BARJAKTAROVIC, N.
5631*
BARRETT, J. C.
5410, 5619*, 5629*
BARRETT, S. F.
5639*
BARSKI, G.
5764*
BARTHOLOMEW, J. C.
5599*
BARTSCH, H.
5401, 5421, 5616*
BASERGA, R.
5473
BASU, J.
5940*
BASU, S.
5705*
BATH, D.
5834*
BAUER, H.
5505*
BAYLIN, S. B.
5785
BAYLIS, P. H.
5810*
BEARD, D.
5511*
BEARD, J. W.
5511*
BEAUVILLAIN, J. C.
5843*
BECK, J.
5983*
BECKER, J. F.
5468
BECKMAN, A.
5671
BELAND, F. A.
5564
BELEHRADEK, J.
5764*
BELITSKII, G. A.
5562
BEMPONG, M. A.
5613*
BENDER, E.
5680
BENTON, B.
5605*
BENZ, U.
5880
BERCZI, I.
5746
BERGERON, M.
5968*
BERGINK, E. W.
5954*
BERLINER, J. A.
5925
BERNARD, D.
5911
BERNDT, H.
5558
BERNS, A.
5654
BERNSTEIN, A.
5520*
BETTENDORF, U.
5847*
BEY, E.
5722*
BHATTACHARYYA, M.
5940*
BHONSLE, R. B.
5890*
BICK, M. D.
5919
BICKERTON, R. K.
5543*
BIERWOLF, D.
5680
BIGNER, D. D.
5733
BINIAMINOV, M.
5728
BIRD, G. W.
5810*
BIRKMAYER, G. D.
5717*
BISHOP, J. M.
5643
BISKIS, B. O.
5491*
BLACK, M. M.
5417

BLACK, P. H.
5749
BLACKBURN, G. R.
5908
BLACKBURN, S. E.
5560
BLAIR, P. B.
5739
BLAKESLEE, J. R.
5666
BLESSING, J.
5904
BLOEMENDAL, H.
5661
BLOMGREN, H.
5923
BLOSS, W.
5788
BLUMING, A.
5452
BOAK, J. L.
5741
BOASBERG, P. D.
5849*
BOCCARA, M.
5684
BOCKSTAHLER, L. E.
5695
BODELL, W. J.
5588
BOEZI, J. A.
5641
BOFFA, L. C.
5990*
BOLOGNESI, D. P.
5529*
BOLT, H. M.
5551, 5592
BOLT, W.
5592
BOMIRSKI, A.
5792
BOONE, C. W.
5710*
BORCBAKAN, C.
5877
BORDES, M.
5445
BOREK, C.
5467
BOREK, E.
5978*
BORLAND, R.
5609*
BORNENS, M.
5908
BORNSTEIN, R. S.
5538*
BOSE, S. K.
5662
BOSTWICK, J.
5830*
BOUCHARD, J. G.
5937*
BOULANGER, P. A.
5683
BRANDEL, W.
5717*
BRANDT, L.
5807
BRANUM, E. L.
5614*
BRAUN-FALCO, O.
5752*
BRETER, H. J.
5983*
BRIDGES, B. A.
5420
BRIMER, P. A.
5607*, 5636*
BRODKEY, F. D.
5878
BROWN, A. L.
5500*
BROWN, J.
5720*
BROWN, J. D.
5875
BROWN, N. J.
5779
BROWN, N. R.
5645
BRUCKNER, H.
5930*
BRUGGE, J. S.
5715*
BRYAN, G. T.
5549
BRYANT, G. M.
5573
BRYNGELSSON, C.
5595*
BUCHER, N. L.
5997*
BUCHTER, A.
5592
BUELL, R.
5787
BUHLER, E. M.
5527*
BULAY, O.
5591
BULLER, P. E.
5471
BUNCHER, C. R.
5896*
BURG, G.
5752*
BURGER, M. M.
5442
BURKE, R. E.
5560
BURTON, D.
5943*
BUSHONG, S. C.
5640*
BUTEL, J. S.
5715*
BUTTS, R. M.
5613*
BUTY, S. G.
5569
CAFFIER, H.
5436
CALDARELLI, D. D.
5848*
CALLAHAN, R.
5685
CALMAN, K. C.
5969*
CALVELLI, T. A.
5712*
CALVIN, M.
5599*
CAPESIUS, C.
5840*
CAPELLA, C.
5846*
CAREY, N. H.
5720*
CARROLL, R. B.
5667
CASAGRANDE, J.
5649
CASPARY, W. J.
5410
CASS, C. E.
5911
CASTLEMAN, J.
5917
CAULET, T.
5782
CELIS, J. F.
5698
CERUTTI, P. A.
5623
CHAMBERS, D. A.
5474
CHAN, J. C.
5655
CHANDRA, P.
5566
CHANES, S.
5761*
CHARP, P. A.
5953*
CHAUSSY, C.
5717*
CHENEY, P. R.
5758*
CHEUNG, C. H.
5700
CHICHE, B.
5861*
CHIECO-BIANCHI, L.
5513*
CHIU, J. F.
5995*
CHO, J. R.
5700
CHRETIEN, J.
5406
CHRISTIAENS, J. L.
5843*
CHRISTIAN, E. J.
5626*
CHRISTIANSON, C. S.
5857*
CHRISTOPHER, C. W.
5939*
CHUMAN, I. M.
5776*
CIESIELSKI-TRESKA, J
5796

CLARKE, S. M. 5618*
CLAYSCN, D. B. 5488*
CLEGG, K. B. 5711*
COHEN, F. P. 5760*
COHEN, G. M. 5567
COHEN, I. R. 5755*
COHEN, S. M. 5591
COLE, A. 5633*
COLE, P. 5537*
COLEMAN, P. S. 5961*
COLLAVO, D. 5513*
CONLEY, J. 5876
COOKE, T. J. 5741
COON, H. G. 5570
COOPER, H. K. 5496*
COOPER, R. I. 5853*
CORCORAN, R. 5419
CORY, J. G. 5916
COSTEA, N. 5945*
COUCH, D. B. 5607*
COUDERC, P. 5819*
COX, C. 5736
COX, R. F. 5922
CRAWFORD, B. D. 5619*
CREASEY, A. A. 5833*
CRISTCFALC, V. J. 5950*
CROSSEN, P. E. 5903
CSUZI, S. 5682
CUATICO, W. 5700
CUCCHIARA, A. J. 5874
CURLING, O. M. 5737
CURREN, R. D. 5630*
CUTRONEO, K. R. 5938*
D'AMBROSIO, S. M. 5550
DANG, C. R. 5864*
DANIEL, M. D. 5697
DANTCHEV, D. 5646
DAS, S. K. 5986*
DATTA, B. N. 5826*
DATTA, R. 5633*
DAVIES, D. L. 5573
DE HARVEN, E. 5712*
DE PICEIS POLVER, P. 5982*
DE SERRES, F. J. 5479*
DE THE, G. 5433
DE VAAN, G. A. 5884
DEBLOIS, R. W. 5702*
DEGOWIN, R. L. 5850*
DEKKER, P. T. 5917
DEL BUONO, I. 5894*
DELELLIS, R. A. 5906
DEMSEY, A. 5765*
DENARDO, G. 5941*
DENARDO, S. 5941*
DENEZ, B. 5824*
DENNER, J. 5660
DENT, P. B. 5793
DEPPERT, W. 5677
DESAI, P. R. 5449
DESSELBERGER, U. 5747
DEVINE, R. L. 5626*
DEYHLE, P. 5858*
DIAMOND, L. 5679
DIATLOFF, C. 5632*
DIEHL, V. 5747
DIPPOLD, W. 5681
DJAKITE, S. 5865
DMOCHOWSKI, L. 5524*, 5655
DODDS, J. A. 5435
DOLBEARE, F. A. 5608*
DORFLER, W. 5663
DORFMAN, N. A. 5660
DORFMAN, S. H. 5901*
DOUVIN, D. 5824*
DREGER, I. 5681
DUBOSE, D. 5697
DUCHAN, Z. 5761*
DUELL, E. A. 5474, 5974*
DUKER, N. J. 5586
DUMONT, J. E. 5915
DUPLAN, J. F. 5658
DUREPAIRE, R. 5456
DYGIN, V. P. 5805
EAST, J. L. 5655
EBELING, K. 5868
EBERHARD, H. 5717*
ECKARDT, R. E. 5584
ECONOMIDOU, J. 5751
EDINGTON, G. M. 5535*
EDMONDSON, H. A. 5605*
EGERT, G. 5574
EGLY, J. M. 5914
EHLER, R. 5814*
EILBER, F. R. 5849*
EIPE, J. 5945*
ELLIS, D. A. 5749
EMMELOT, P. 5579
ENGBAEK, F. 5698
ENGELHARDT, E. 5887*
ENTERLINE, P. W. 5869
EPPENBERGER, U. 5820*
EPPLEY, S. 5703*

EPSTEIN, M. A.
5440
EPSTEIN, W.
5633*
ERB, H.
5533*
ERBE, R. W.
5936*
ERDOS, Z.
5463
ERGEN, G.
5877
ERIKSON, E.
5647
ERIKSON, R. L.
5647
ERIKSSON, S.
5852*
ERON, L.
5685
ESTES, J. D.
5649
EVANS, D. R.
5937*
EVANS, R. M.
5618*
FABISCH, P. H.
5918
FABRICIUS, H. A.
5727
FAERBER I.
5694
FAGGIANO, M.
5846*
FAGUET, G. B.
5815*
FAHMY, M. J.
5575
FAHMY, O. G.
5575
FAIRBANKS, G.
5959*
FALK, H. L.
5490*
FARBER, E. M.
5946*
FAROOKHI, R.
5949*
FASSKE, E.
5657
FAURE, H.
5819*
FAUSTO, N.
5929*
FEDORTSEVA, R. F.
5805
FEIGELSON, P.
5975*
FELDMAN, M.
5755*
FELLNER, P.
5720*
FENNELLY, P. F.
5485*
FENNER, F.
5521*
FERDINAND, F. J.
5685
FERRANDO, R.
5413
FESTENSTEIN, H.
5724, 5767*
FETTING, R.
5657
FIELD, E. J.
5743
FINK, L. M.
5618*
FINK, U.
5731
FINKEL, M. P.
5491*
FISCHER, R.
5904
FISHBEIN, L.
5489*
FISHER, B.
5465
FISHER, E. R.
5465
FLANDRIN, G.
5456
FLINT, S. J.
5686
FLOCH, M. H.
5901*
FOMENKO, V. N.
5676
FONG, C. K.
5664
FORCADE, C. M.
5896*
FOSSA, S. D.
5798
FOSSATI, P.
5843*
FOWLER, A. K.
5699
FOX, B. W.
5581, 5583
FOX, M.
5703*
FRALEY, E. E.
5732
FRANKE, F.
5585
FRANKEL, F. R.
5775*
FRAZIER, M. E.
5627*
FREEDMAN, S. O.
5448
FREEDMAN, V. H.
5714*
FREEMAN, C. B.
5759*
FREI, E.
5509*
FRELINGER, J. A.
5447
FRENSTER, J. H.
5859*
FRIEDELL, G. H.
5591
FRIEDL, H. P.
5464
FRIEDMAN, D. L.
5898*
FRIEDMAN, H.
5750
FRIIS, R. R.
5508*
FRISBY, D. P.
5720*
FRITZ, J.
5734
FUCHS, D.
5882
FUJII, Y.
5903
FUKS, A.
5725
FUKUSHIMA, S.
5582
FUKUYAMA, K.
5833*
FUTRELL, J. W.
5637*
GAFFNEY, E. V.
5560
GALUSKA, S.
5765*
GAMARRA, M. C.
5487*
GANDAGULE, V. N.
5812*
GANN, D. S.
5785
GARBRECHT, M.
5921
GARDNER, M. B.
5649
GARRIDO, F.
5724
GARRO, A. J.
5615*
GARVIN, A. J.
5726
GATES, R. F.
5910
GAUTVIK, K. M.
5956*
GAZDAR, A.
5704*
GEDDES, E. W.
5690
GELBOIN, H. V.
5570
GELDERBLOM, H.
5716*
GELEHRTER, T. D.
5924
GERICKE, D.
5566
GERULATH, A. H.
5951*
GERZELI, G.
5982*
GESER, A.
5433
GESSNER, T.
5565
GHERIDIAN, B.
5749

GIBEL, W.
5558
GIBSON, D. P.
5850*
GIBSON, R.
5883
GIELKENS, A. L.
5661
GILBERT, R. W.
5733
GILDOW, J.
5604*
GILLIET, F.
5880
GINSBURG, I.
5761*
GISSMANN, L.
5681
GITSCH, E.
5769*
GITTES, R. F.
5777
GLANNELLI, F.
5498*
GLEICHMANN. E.
5742
GLEICHMANN, H.
5742
GOLD, P.
5725
GOLDFARB, S.
5468
GOLDFEDER, A.
5987*
GOLDSCHMIDT, B. M.
5568
GOLDSTEIN, M. N.
5965*
GONDOS, B.
5494*
GORDON, P. A.
5810*
GORECKI, M.
5675
GORIN, J. P.
5863*
GOROSHCHENKO, IU. L.
5805
GOSSLEE, D. G.
5636*
GOSSLER, K.
5887*
GOSSNER, W.
5628*
GOT, R.
5996*
GOUBIN, G.
5646
GRAFFI, A.
5680
GRAHAM, S.
5883
GRANZOW, C.
5942*
GRANZOW, V.
5942*
GRAPPELLI, C.
5650
GRAY, L. A.
5534*
GREEN, H.
5472
GREENBERG, S. D.
5857*
GREENE, R. F.
5929*
GREGORY, S. H.
5662
GREIM, H.
5574
GRIFFITHS, J. D.
5800
GRIMM, W.
5621
GROND, K.
5734
GROSHONG, J. C.
5955*
GROSS, K. J.
5977*
GROSS, L.
5648
GROSSER, N.
5772*
GROSSHANS, E.
5840*
GROSSMAN, S. H.
5468
GROVER, P. L.
5401
GRUBBS, C. J.
5563
GRUND, F. M.
5850*
GRUNER, B.
5899*
GRUPPER, C.
5456
GUELLAEN, G.
5957*
GUILLEMAIN, B.
5658
GUIRGIS, H. A.
5878
GUNNING, J. E.
5495*
GUNZ, F. W.
5903
GUPTA, B. N.
5823*
GUPTA, J. C.
5812*
GUPTA, N. M.
5826*
GURNEY, E.
5671
GURR, J. A.
5468
GUSDON, J. P.
5691
GUTHERT, H.
5891*
GUTJAHR, P.
5621, 5886*
HACKETT, A.
5833*
HACKETT, A. J.
5821*, 5855*
HACKETT, P. L.
5627*
HADJIOLOV, A.
5928*
HAGEMAN, P. C.
5514*
HAGEMANN, G.
5634*
HAGERSTRAND, I.
5852*
HAJDUKIEWICZ, Z.
5802
HAKALA, T. R.
5732
HALABAN, R.
5952*
HAMILTON, E. I.
5493*
HAMILTON, P. I.
5435
HAMILTON, R. T.
5674
HAMMER, C.
5717*
HAMMERLING, G. J.
5528*
HAN, T.
5754*
HANABUSA, S.
5803
HANAFUSA, H.
5642
HANANOUCHI, M.
5582
HANOUNE, J.
5957*
HANSSON, A.
5962*
HARD, G. C.
5609*
HARDIN, J. M.
5635*
HARISH KUMAR, P. M.
5981*
HARLEY, H. R.
5872
HARNDEN, D. G.
5455
HARRIS, R.
5759*
HARRIS, T. J.
5720*
HART, R. W.
5666
HARTMAN, R. M.
5952*
HARTWICH, G.
5814*
HARVEY, R. G.
5564
HASHIMOTO, K.
5834*, 5835*
HAUG, E.
5956*
HAVEL, V.
5867

HAVRE, P. A.
  5937*
HAYES, P. R.
  5793
HAYS, E. F.
  5659
HAYWARD, W. S.
  5642
HEATH, J. P.
  5967*
HECKER, E.
  5404, 5477
HEGGE, K.
  5747
HEHLMANN, R.
  5718*
HEITBROCK, H. W.
  5921
HELLMAN, A.
  5699
HELLMAN, K. B.
  5695
HELLRIEGEL, K. P.
  5804
HELSON, L.
  5986*
HENDERSON, B. E.
  5605*, 5649
HENDERSON, V.
  5869
HENEEN, W. K.
  5962*
HENLE, G.
  5441
HENLE, W.
  5441
HENNEN, G.
  5451
HENNINGS, H.
  5484*
HERBERMAN, R. B.
  5762*
HERNUSS, P.
  5769*
HEROLD, H. J.
  5882
HERR, H. W.
  5773*, 5862*
HUEBNER, R. J.
  5649
HIAI, H.
  5966*
HILL, M.
  5646
HILLEN, H. F.
  5884
HIRAO, K.
  5578
HIRCHE, K. P.
  5707*
HIROSE, M.
  5582
HIRSCH, M. S.
  5749
HIRSCHHORM, K.
  5453
HLOZANEK, I.
  5506*
HNILICA, L. S.
  5995*
HOAGLAND, P. M.
  5757*
HOANG NGOC MINH
  5824*
HEFNER, M.
  5778
HOFFMAN, R. M.
  5936*
HOFFMANN, D.
  5480*
HOLDEN, H. T.
  5762*
HOLMES, E. C.
  5723
HOLOUBEK, V.
  6000*
HOLOWCZAK, J. A.
  5679, 5721*
HOLZEL, F.
  5707*
HONETZ, N.
  5730
HOOD, B.
  5600*
HOOVER, R.
  5897*
HOROWITZ, M.
  5738
HOSBACH, H. U.
  5783
HOUGHTON, J. A.
  5970*
HOWARD, E.
  5938*
HOWARD, R.
  5419
HOWARD, T.
  5706*
HSIE, A. W.
  5607*, 5636*
HSIEH, D. P.
  5545
HSIUNG, G. D.
  5664
HSU, S. H.
  5785
HUANG, S. M.
  5941*
HUBER, P.
  5820*
HUBNER, G.
  5530*
HUDSON, C. N.
  5737
HUET, C.
  5909
HUG, O.
  5628*
HUHN, D.
  5731
HUMPHREY, R. M.
  5638*
HUNT, R. D.
  5697
HUPER, G.
  5529*
HURLEY, E. J.
  5864*
HURST, G. A.
  5857*
HURST, I. J.
  5857*
HURWITZ, J.
  5503*
HUSBY, G.
  5757*
HUTCHISON, D. J.
  5712*
IARC WORKING GROUP
  5414, 5416, 5418, 5422
ICHIHASHI, M.
  5624
IDE, T.
  5668
IKEDA, S.
  5794
IRWIN, R. J.
  5937*
ISAKSSON-FORSEN, G.
  5943*
ISHAK, K.
  5461
ISHAK, K. G.
  5461
ISHIDA, M.
  5794
ISHIKAWA, M.
  5803
ITABASHI, M.
  5547
ITO, N.
  5578, 5582
IVINS, J. C.
  5774*
IYENGAR, J. P.
  5580
JACOBI, G. H.
  5768*
JACOBI, W.
  5429
JACOBS, J. B.
  5591
JACOBSON, J. B
  5765*
JAENISCH, R.
  5654
JAESCHOCK, P. R.
  5748
JAFFE, N.
  5408, 5459
JAIN, V. K.
  5812*
JANSSON, B.
  5900*
JARRETT, W. F.
  5512*, 5665
JASMIN, C.
  5651
JAYME, D. W.
  5980*
JENEY, A.
  5935*
JERKINS, G.
  5736

JOHNSON, D. R.
5701*
JOHNSON, E. A.
5958*
JOHNSON, W. C.
5939*
JOISHY, S. K.
5853*
JOKLIK, W. K.
5503*
JOLICOEUR, P.
5656
JOLLEY, G. M.
5770*
JORTAY, A.
5915
JOSEY, W. E.
5515*
KAALHUS, O.
5798
KALDEN, J.
5747
KALTOFT, K.
5698
KAMMER, K.
5670
KANZAKI, T.
5834*, 5835*
KAO, F. T.
5964*
KAPPUS, H.
5592
KARASAKI, S.
5993*
KARCHER, K. H.
5769*
KARDINAL, C.
5989*
KARRER, K.
5464
KASPER, C. B.
5908
KASPERSON, E. H.
5432
KAWAMURA, T.
5794
KAWANA, T.
5894*
KEENAN, T. W.
5598*
KEILER, A.
5841*
KELLERER, K.
5828*
KELLEY, D. E.
5976*, 5985*
KELLY, F.
5684
KEMP, R. G.
5979*
KEMPF, J.
5914
KERDILES, C.
5651
KERRIGAN, J. M.
5994*
KEW, M. C.
5690
KEY, M.
5430
KHOO, S. K.
5753*
KILLION, J. J.
5933*
KIM, S. C.
5911
KIM, Y.
5974*
KIMURA, H.
5786
KING, L. E.
5835*
KIRKLAND, W. L.
5552, 5553, 5554
KISNER, W. H.
5822*
KITAMURA, S.
5546
KITZING, P.
5600*
KLEIHUES, P.
5496*
KLEIN, B.
5651
KLEIN, G.
5439, 5444, 5450
KLEINBERGS-KRISANS, S.
5971*
KLEINSMITH, L. J.
5672
KLIETMANN, W.
5434
KNESEK, J. E.
5655
KNUDSON, A. G.
5856*
KOCEMBA-SLIWOWSKA, U.
5959*
KOLAR, G. F.
5616*
KOLLMER, H.
5895*
KOLLMORGEN, G. M.
5933*
KOMOR, J.
5784
KONIG, M. P.
5784
KOPP, D.
5707*
KOROPATNICK, D. J.
5425
KORSGAARD, R.
5600*, 5943*
KORTH, M.
5891*
KOUTTAB, N. M.
5699
KRAFT, C.
5878
KRAUSE, M. O.
5672
KROHN, K.
5941*
KRONERT, M.
5868
KRULL, P.
5747
KRUSE, H.
5902
KUCERA, L. S.
5691
KUHLENDAHL, H.
5530*
KUHN, C.
5670
KUHNDEL, K.
5868
KUMAR, P. M.
5920
KUMARI, H. L.
5662
KUNG, L. G.
5893*
KUO, J. F.
5758*
KUO, T. H.
5597*
KURTZ, D. T.
5975*
KURZ, J. B.
5898*
KUSAMA, T.
5499*
KUTSCHERA, W.
5873
KUZMA, R. J.
5896*
L'HERMITE, M.
5843*
LACOMBE, M. L.
5957*
LAHAV, M.
5761*
LAI, S. P.
5685
LAIPIS, P. J.
5669
LAISHES, B. A.
5425
LAKSHMI, M. V.
5662
LAM, K. W.
5917
LAM, P. P.
5425
LAMBIASE, J. T.
5560
LANDE, M.
5928*
LANDOLPH, J. R.
5599*
LANDOLT, A. M.
5783
LANDRUM, S. R.
5859*
LANGE, P. H.
5732
LANGENBACH, R.
5603*
LANGLANDS, A. O.
5816*
LAPIN, B. A.
5688

LAPIS, K.
5935*
LAUFS, R.
5663, 5696
LAURENCE, E. B.
5944*
LAVIETES, B. B.
5961*
LAVROVSKY, V. A.
5729
LAW, I. P.
5817*
LAWLER, S. D.
5526*
LAWSON, T. A.
5585
LEDER, L. D.
5886*
LEE, L. F.
5641
LEEDS, S. E.
5510*
LEFFAK, I. M.
5927*
LEGER, L.
5861*, 5863*
LEIS, H. P.
5417
LEIS, J.
5503*
LEPPARD, B.
5829*
LERNER, A. B.
5952*
LESKO, S. A.
5410
LEVAN, G.
5807, 5962*
LEVER, J. E.
5673
LEVI, J. A.
5903
LEVIN, L.
5737
LEVIN, M.
5883
LEW, M. A.
5645
LEWIS, U. J.
5469
LI, J. L.
5692
LIANG, W.
5760*
LIAO, S. K.
5793
LIEBERMAN, P.
5736
LIEBES, L.
5708*
LIJINSKY, W.
5411
LILIENFELD, A.
5883
LINQUETTE, M.
5843*
LIPKIN, M.
5998*
LIVINGSTON, D. M.
5706*
LO, L. W.
5425
LOEB, L. A.
5611*
LONDON, W. T.
5536*
LONGMIRE, W. P.
5557
LOPEZ DEL PINO, V.
5551
LOPP, A. K.
5562
LORANS, G.
5947*
LORENTZEN, R. J.
5410
LORKE, D.
5612*
LOSKANT, H.
5870
LOUVEL, A.
5861*
LOVELACE, E.
5926
LOW-BEER, T. S.
5809*
LOZZIO, B. B.
5740
LOZZIO, C. B.
5740
LUBITZ, W.
5717*
LUDUENA, M. A.
5988*
LUFTIG, R. B.
5708*
LUND, J. E.
5627*
LUNDELL, G.
5923
LUSHBAUGH, C. C.
5497*
LUZ, A.
5628*
LYNCH, H. T.
5789, 5878
LYNCH, J.
5878
LYNCH, P.
5878
LYTLE, C. D.
5695
MABRY, L. C.
5857*
MABUCHI, K.
5480*
MACCHIA, V. M.
5846*
MACHEMER, L.
5612*
MACIEIRA-COELHO, A.
5632*
MACKAY, I. R.
5753*
MACKEY, M. C.
5811*
MACLEAN, N.
5816*
MACNAB, G.
5722*
MACNAB, G.
5722*
MACNAB, G. M.
5690
MACSWEEN, J. M.
5753*
MAEKAWA, A.
5587
MAGDON, E.
5885
MAGEE, P. N.
5409
MAHER, V. M.
5630*
MAJRANOWSKI, A.
5986*
MAK, S.
5687
MALAISE, E.
5632*
MALARKEY, W. B.
5955*
MALAVEILLE, C.
5616*
MALICK, L.
5603*
MALONEY, K.
5878
MAMAEVA, S. E.
5805
MANANDHAR, M. S.
5559
MANDATO, E.
5846*
MANDEL, P.
5796
MANGUM, J. H.
5920, 5980*, 5981*
MANLY, K. F.
5705*
MANOR, Y.
5755*
MANOUSOS, O. N.
5751
MANSELL, M. M.
5916
MANUELIDIS, E. E.
5797
MANUELIDIS, L.
5797
MANY, A.
5728
MARCELO, C. L.
5474, 5974*
MARDINEY, M. R.
5637*
MARIAGE, R.
5646
MARINI, G.
5982*
MARINOFF, S. C.
5825*
MARSHALL, T. H.
5704*

* INDICATES A PLAIN CITATION WITHOUT ACCOMPANYING ABSTRACT

MARTEL, M. B. 5996*
MARUYAMA, K. 5655
MASEK, M. A. 5859*
MASON, T. J. 5897*
MASSE, R. 5406
MASUDA, M. 5556
MATAS, A. J. 5881
MATHEWS, F. M. 5875
MATLAGE, W. T. 5857*
MAURON, A. 5973*
MAYS, E. T. 5555
MAZZUCA, M. 5843*
MCALLISTER, R. A. 5969*
MCAVOY, J. M. 5557
MCCLUNG, H. 5693
MCCORMICK, J. J. 5630*, 5708*
MCCULLOCH, P. B. 5793
MCCULLOUGH, D. L. 5777
MCDEVITT, D. G. 5572
MCHARDY, J. E. 5737
MCKEEVER, P. E. 5726
MCKHANN, C. F. 5432
MCLAREN, J. R. 5758*
MCLAUGHLIN, A. P. 5777
MCLAUGHLIN, C. A. 5912, 5913
MCLIMANS, W. F. 5934*
MCMACKEN, M. V. 5617*
MCNUTT, N. S. 5836*
MEDVECZKY, P. 5682
MEHTA, F. S. 5890*
MELENDEZ, L. V. 5697
MELLMANN, J. 5634*
MENAHAN, L. A. 5979*
MENZIES, R. A. 5994*
MERIKAS, G. 5751
MERRITT, W. D. 5598*
MERTELSMANN, R. 5921
METCALF, D. 5523*
METCALFE, J. C. 5470
METCALFE, S. M. 5470, 5609*
METHFESSEL, G. 5865
METHFESSEL, H. D. 5865
MEYERS, P. 5701*
MEYSKENS, F. L. 5460
MEZGER-FREED, L. 5610*
MICHALSKI, F. J. 5664
MICHEEL, B. 5680
MILES, W. F. 5580
MILLER, F. C. 5403
MILLER, J. A. 5403
MILLER, R. W. 5889*
MILO, G. E. 5666, 5955*
MILVY, P. 5615*
MINNA, J. D. 5704*
MINOWADA, J. 5754*
MITCHELL, A. D. 5617*
MITCHELL, J. L. 5985*
MITCHELL, T. J. 5636*
MITELMAN, F. 5595*, 5807
MITTERMAYER, K. 5730
MIURA, T. 5794
MOCHIZUKI, Y. 5547
MODAN, B. 5454
MOELLING, K. 5652
MOESTRUP, T. 5852*
MOGENSEN, S. C. 5719*
MONTESANO, R. 5421
MOORE, B. P. 5567
MORAN, E. M. 5832*
MORONI, C. 5713*
MORRE, D. J. 5598*
MORRISON, M. 5910
MORTON, D. L. 5849*
MOSES, H. L. 5602*, 5614*
MOTT, D. M. 5918
MUDERRIS, S. 5877
MUHLBOCK, O. 5514*
MUKERJEE, H. 5987*
MULLER, H. 5527*
MULLER-HERMELINK, H. K. 5886*
MULLER, W. A. 5628*
MULLIGAN, R. C. 5675
MUNOZ, N. 5433
MURTHY, M. S. 5764*
MUTZ, I. 5828*
N'GOLET, A. 5819*
NAGASAWA, H. T. 5597*
NAHMIAS, A. J. 5515*, 5894*
NAIB, Z. M. 5515*
NAJARIAN, J. S. 5881
NAKADATE, M. 5587
NAKANISHI, K. 5578
NAPALKOV, N. P. 5589
NASZ, I. 5692
NAZERIAN, K. 5641
NE'EMAN, N. 5761*
NEBERT, D. W. 5571
NEIFELD, J. P. 5460
NEUMANN, F. 5730
NEVILLE, D. M. 5960*
NEWBERRY, B. H. 5604*
NEWMAN, J. F. 5720*

NEWSTEAD, G. L.
5800
NEWTON, C.
5720*
NICOLAOU, A.
5751
NICOLINI, C.
5473
NIEDERHUBER, J. E.
5447
NIELSEN, S. W.
5525*
NIES, A. S.
5572
NIEZABITOWSKI, A.
5680
NIKAIDO, O.
5581, 5583
NILSEN-HAMILTON, M.
5674
NILSSON, K.
5727
NILSSON, P. G.
5807
NISHIZUKA, Y.
5966*
NOEDL, F.
5466
NOONAN, K. D.
5672
NORDEN, A.
5595*
NORDEN, G.
5600*
NORTH, J. A.
5920
NORTH, L. B.
5640*
NOVAK, D.
5788
NOVER, A.
5886*
NOVOGRODSKY, A.
5984*
O'BRIEN, S. J.
5710*
O'MALLEY, B. W.
5471
O'NEILL, J. P.
5607*
ODASHIMA, S.
5587
OFFRET, M. H.
5795
OHKUMA, V. M.
5838*
OHNO, S.
5457
OKAJIMA, K.
5803
OLDHAM, R. K.
5762*
OLKOWSKI, A. L.
5758*
ONG, T. M.
5412
ONUIGBO, W. I.
5540*
OPETZ, W.
5899*
ORENBERG, F. K.
5946*
ORENSTEIN, J. M.
5766*
ORESTANO, F.
5768*
ORTALDO, J. P.
5762*
OUELLETTE, L. M.
5630*
OVANESBEKOVA, T. G.
5780
OWEN, R.
5871
OWENS, R. B.
5821*
OZER, H. L.
5678
PAGANO, J. S.
5689
PAGES, A.
5458
PAI, S. R.
5781
PALENCIA, C.
5769*
PAMUKCU, A. M.
5549
PANALAKS, T.
5580
PANH, M. H.
5819*
PANTUCEK, F.
5841*
PAPE, C.
5707*
PAPSDORF, G.
5680
PARC, P.
5824*
PARIZA, M. W.
5468
PARK, J. F.
5627*
PARKS, R. C.
5771*
PARSONS, D. F.
5705*
PASQUIER, B.
5819*
PASQUIER, D.
5819*
PASTAN, I.
5926
PATEL, N.
5750, 6000*
PATERSON, A. R.
5911
PAULY, J.
5754*
PAYNE, L. N.
5504*
PECK, H. M.
5481*
PEDERSEN, S. N.
5799
PEDRON, J.
5909
PEDULLA, D.
5905
PEISON, B.
5791
PELLEGRINO, M. A.
5723
PENDERGRAST, W. J.
5637*, 5830*
PENDIC, B.
5631*
PENMAN, B. W.
5606*
PERDUE, J. F.
5948*
PERO, R. W.
5595*
PERRAS, J. P.
5994*
PERRY, R. A.
5967*
PERRY, R. P.
5976*, 5985*
PHILLIPS, D. L.
5594*
PICKREN, J. W.
5487*
PIKE, M.
5649
PIKE, M. C.
5763*
PIKO, L.
5711*
PINCUS, T.
5703*
PINDBORG, J. J.
5890*
PINTEAUX, A.
5782
PIPER, P. W.
5698
PISANO, G.
5846*
PITOT, H. C.
5912, 5913
PLENERT, W.
5882
POCHET, R.
5915
POCHIN, F. E.
5431, 5593
POGO, A. O.
5977*
POLANOWSKI, F. P.
5560
POLLACK, R.
5714*
PONTEN, J.
5443
POPP, F. A.
5402
PORT, R.
5493*
PORTENKO, G. M.
5801
POSTE, G.
5516*

* INDICATES A PLAIN CITATION WITHOUT ACCOMPANYING ABSTRACT

POTTER, J. E. 5961*
POTTER, V. R. 5468
POULTON, T. A. 5737
POUND, A. W. 5585
POUSSE, G. 5782
PRAJDA, N. 5478
PRASAD, N. 5640*
PRASAD, R. 5640*
PREISZ, J. 5820*
PREUSSMANN, R. 5492*
PRICE, J. M. 5549
PRICE, M. R. 5735
PRINCE, A. M. 5875
PRIORI, E. S. 5655
PRITCHARD, D. J. 5774*
PROFFITT, M. R. 5749
PROP, F. J. 5561
PRUNIERAS, M. 5456
PUGH, R. C. 5866
QUIRIN-STRICKER, C. 5914
RABIN, L. 5791
RADASZKIEWICZ, T. 5841*
RAFF, M. C. 5507*
RAGAN, H. A. 5627*
RAINEY, T. 5529*
RAIZADA, M. K. 5948*
RALL, S. C. 5635*
RAMONI, C. 5650
RAMOT, B. 5728
RAMSAY, C. A. 5624
RANKIN, L. 5878
RAO, N. A. 5920, 5980*
RAPAPORT, E. 5997*
RAPP, F. 5692
RAWLS, W. E. 5693
RAZVOROTNEV, V. A. 5729
REDMANN, K. 5744
REESE, R. L. 5604*
REEVES, B. R. 5526*
REGAN, J. D. 5627
REICH, S. D. 5913*
REICHBERG, S. B. 5924
REID, L. 5963*
REILLY, C. A. 5491*
REIMAN, H. M. 5614*
REISFELD, R. A. 5723
REMSEN, J. F. 5623
RENE, E. 5957*
REUBER, M. D. 5596*
REVESZ, L. 5900*
RICH, A. 5675
RIMAI, L. 5708*
RIOS, A. 5745
RISIUS, J. 5671
RISSER, R. 5714*
RISSER, W. L. 5924
RITTS, G. E. 5701*
RITTS, R. E. 5774*
ROBBINS, J. H. 5639*
ROBERTS, B. E. 5675
ROBINS, R. A. 5446
ROBINSON, D. E. 5617*
RODT, H. 5731
ROESEL, R. A. 5938*
ROHME, D. 5962*
ROIZMAN, B. 5437
RONGEY, R. W. 5649
ROSENFELD, C. 5947*
ROSENKRANZ, H. S. 5590
ROSENTHAL, E. 5728
ROSOL, M. 5867
ROSSI, G. B. 5650
ROTH, J. 5926
ROTH, J. A. 5723
ROTH, M. 5531*
ROUX, A. 5983*
ROWLEY, P. T. 5853*
ROWSON, K. E. 5517*
ROY, S. C. 5940*
ROZENBLATT, S. 5675
RUBZOV, N. B. 5729
RUCHTI, C. 5784
RUCKHABERLE, B. 5868
RUDIGER, K. D. 5891*
RUDOLPH, M. 5680
RUHLAND, D. 5657
RUPPELT, W. 5731
RUSH, B. D. 5572
RYAN, J. M. 5950*
RYFFEL, U. 5783
SABATINI, D. 5928*
SACKSTEDER, M. R. 5994*
SAFFIOTTI, U. 5494*
SAGLIER, I. 5456
SAHARIAH, S. 5826*
SAIER, M. H. 5776*
SAINE, S. E. 5601*
SAKULA, A. 5532*
SALDEN, M. H. 5661
SALL, S. 5417
SALMEEN, I. 5708*
SALOKANGAS, A. 5820*

SALSBURY, A. J.
5800
SALTZSTEIN, S. L.
5777
SAMBROOK, J.
5686
SAMPAT, M. B.
5839*
SAN, R. H.
5425
SAND, G.
5915
SANDERS, C. L.
5502*
SARKAR, N. H.
5703*
SARMA, D. S.
5931*
SARTORIUS, J. A.
5527*
SASSIER, P.
5968*
SATO, G.
5963*
SAUER, G.
5670
SAUK, J. J..
5790
SCANLON, E. F.
5449
SCHAEFER, H. E.
5804
SCHALLER, K. H.
5887*
SCHAUENSTEIN, E.
5907
SCHECHTMAN, L. M.
5410
SCHECTMAN, L. M.
5629*
SCHERER, E.
5579
SCHERF, H. R.
5577
SCHIDLOVSKY, G.
5648
SCHINCARIOL, A. L.
5503*
SCHINDLER, R.
5907
SCHIRRMACHER, V.
5724, 5767*
SCHMAHL, D.
5483*
SCHMID, M.
5405
SCHMITT, M.
5914
SCHNEIDER, J.
5694
SCHNEIDER, R. D.
5664
SCHONBERGER, W.
5621
SCHOTTENFELD, D.
5541*
SCHREIBER, G.
5475
SCHREIBER, M.
5475
SCHUBERT, T.
5657
SCHULLER, D. E.
5876
SCHULZ, S.
5868
SCHUMAN, L.
5883
SCHUMANN, G.
5713*
SCHWARTZ, S. A.
5709*
SCHWARZMEIER, J. D.
5730
SCHWEIZER, H.
5694
SCOTT, G. L.
5809*
SEAGER, W.
5842*
SEEMAYER, T. A.
5787
SEHON, A. H.
5746
SELA, M. N.
5761*
SELIKOFF, I. J.
5486*
SEN, N. P.
5580
SETH, P.
5693
SETLOW, R. B.
5550, 5620, 5622
SHARMA, R. K.
5913
SHARMA, R. P.
5912
SHARP, P. A.
5686
SHELTON, E.
5766*
SHIMKIN, M. B.
5542*
SHIN, S. I.
5714*
SHINOHARA, Y.
5578
SHIRAI, T.
5582
SHIROTA, F. N.
5597*
SHISA, H.
5966*
SHOOTER, K. V.
5576
SHRIKHANDE, S. S.
5839*
SHUBIK, P.
5482*
SHUSTER, J.
5725
SICILIANO, M. J.
5638*
SILVA, D.
5697
SIMMONS, R. L.
5745
SIMON, K. H.
5522*
SIMONNET, H.
5996*
SIMONSON, J. M.
5710*
SIMONSSON, B. G.
5600*
SINGH, S.
5903
SINOR, P. N.
5890*
SIPPEL, A. E.
5975*
SIRBASKU, D. A.
5552, 5553, 5554
SIROTA, D. K.
5825*
SIROVER, M. A.
5611*
SKINNER, J. M.
5751
SLAGA, T. J.
5548, 5569
SLATER, M. L.
5678
SLOCUM, H. K.
5723
SLODKOWSKA, J.
5802
SMADJA, A.
5824*
SMADJA-JOFFE, F.
5651
SMILEY, J. R.
5687
SMITH, A. E.
5667
SMITH, H.
5833*
SMITH, H. S.
5808*
SMITH, K. C.
5427
SMITH, P. E.
5608*, 5644
SNYDERMAN, R.
5763*
SOCHOR, H.
5744
SOFFER, M.
5919
SOLOMON, S. S.
5835*
SONG, C.
5941*
SONNENSCHEIN, C.
5949*
SONODA, T.
5740
SOPRANI, A.
5861*
SOROF, S.
5918
SORRENTINO, J. M.
5552, 5553, 5554

SOUKOP, M.
5969*
SPECK, W. T.
5590
SPECTER, S.
5750
SPELSBERG, T. C.
5602*, 5922
SPENCE, C.
5706*
SPERLING, R. L.
5848*
SPICER, S. S.
5726
SPIEGELMAN, S.
5718*
SPOHR, G.
5973*
SPRINGER, E. L.
5821*, 5855*
SPRINGER, G. F.
5449
SPROESSIG, M.
5694
STACKPOLE, C. W.
5765*
STALDER, G. R.
5527*
STAMBAUGH, J. E.
5590
STAVRAKY, K. M.
5539*
STEARNER, S. P.
5626*
STECK, B.
5501*
STEFFEN, C.
5769*
STEHELIN, D.
5643
STEIN, G. S.
5672
STEINER, W.
5681
STEINKE, H.
5663, 5696
STENMAN, S.
5727
STICH, H. F.
5425
STILES, C. D.
5776*
STOCKDORPH, O.
5530*
STOLIER, A. J.
5741
STONE, M.
5503*
STOTZER, H.
5895*
STRAFUSS, A. C.
5888*
STRAUSS, B. S.
5424
STRICKLAND, J. E.
5699
STRICKLAND, R. G.
5757*
STRNAD, L.
5867
STRNISTE, G. F.
5635*
STROBEL, H. W.
5601*
STROTHER, J. T.
5572
SUGIHARA, S.
5578
SULSER, H.
5858*
SUSSMAN, H. H.
5988*
SWANSON, M.
5883
SWARTZ, M.
5878
SWARTZENDRUBER, D. C.
5497*
SWIFT, M.
5806
SYDOW, G.
5680
SZANIAWSKI, W.
5802
SZENDE, B.
5935*
TAGO, M.
5786
TAKAHASHI, M.
5582
TALMADGE, K.
5820*
TANAKA, S.
5786
TANAKA, T.
5786
TATEMATSU, M.
5582
TATSUMI, K.
5546
TAYLOR, D. M.
5970*
TAYLOR, G. M.
5759*
TEEBOR, G. W.
5586
TEICH, N.
5713*
TENFORDE, T. S.
5671
TERADA, K.
5803
TERNI, M.
5438
THEMANN, H.
5657
THIEL, E.
5731
THIEL, K. D.
5694
THILLY, W. G.
5606*
THOLIN, B.
5845*
THOMAS, J. A.
5559
THOMAS, J. O.
5426
THOMAS, J. W.
5736
THOMOPOULOS, P.
5926
THOMPSON, H. R.
5829*
THOMPSON, S.
5548, 5569
THOMPSON, T. F.
5892*
THOMSOM, J. A.
5995*
THOMSON, D. M.
5772*
THORNLEY, A. L.
5944*
THULIN, T.
5595*
THURAUF, J.
5887*
TICHMANN, I.
5717*
TIKHONOV, V. J.
5729
TILOV, T.
5895*
TILZ, G. P.
5734
TING, C. C.
5756*
TJERNSHAUGEN, H.
5956*
TOBIAS, C. A.
5671
TODD, P.
5428
TOGAWA, K.
5625
TOMPKINS, R. K.
5557
TORMEY, D. C.
5460
TRAMU, G.
5843*
TRELL, E.
5600*
TREVES, A. J.
5755*
TS'O, P. O.
5410
TS'O, P. O.
5619*, 5629*
TSAY, H. M.
5746
TSENG, M. T.
5954*
TSUKADA, H.
5547
TSUNODA, H.
5578
UCKERT, W.
5680
UEHLINGER, M.
5844*
ULFELDER, H.
5415

* INDICATES A PLAIN CITATION WITHOUT ACCOMPANYING ABSTRACT

ULLREY, D.
5939*
URASINSKI, I.
5827*
URBANOWICZ, J.
5722*
URBANOWICZ, J. M.
5690
URMAN, H. K.
5591
VACHA, K.
5867
VALLADARES, Y.
5518*
VAN DER LINDE, F.
5879
VAN DUUREN, B. L.
5568
VAN ELDIK, L. J.
5644
VAN SCOTT, E. J.
5407
VANAMAN, T. C.
5644
VARIAKOJIS, D.
5832*
VARMUS, H. E.
5643
VASCONEZ, L. O.
5830*
VETTER, J. M.
5840*, 5851*
VIGO, E.
5982*
VINCENT, P. C.
5903
VISSER, A. S.
5561
VIT, V. V.
5462
VOLLET, J. J.
5715*
VOORHEES, J. J.
5474, 5974*
VORHERR, H.
5423
VREDEVOE, D. L.
5659
WAALKES, T. P.
5978*
WAHRENDORF, J.
5483*
WALDECK, W.
5670
WALTER, G.
5677
WALTER, P.
5851*
WALTHER, J. R.
5832*
WANG, A. C.
5725
WANG, N. S.
5787
WARNER, N. L.
5753*
WAROCQUIER, R.
5683
WARREN, G. B.
5470
WARTER, S.
5796
WATERSON, A. P.
5516*
WATTERSON, D. M.
5644
WEBB, H. H.
5815*
WEBER, G.
5478
WEBSTER, R. A.
5602*
WECHSLER, W.
5860*
WEGHAUPT, K.
5769*
WEISSE, I.
5895*
WELSH, J. D.
5875
WESLEY, R. K.
5702*
WESTERCAMP, T.
5878
WESTPHAL, H.
5685
WHEELOCK, E. F.
5653
WHIMSTER, I. W.
5837*
WHITE, J. G.
5790
WHITE, M. T.
5972*
WHITFORD, T. W.
5916
WHITLOCK, J. P.
5570
WHITSON, G. L.
5953*
WHITSON, M. E.
5740
WICKE, L.
5769*
WIDMAIER, R.
5680
WIEPJES, G. J.
5561
WIERNIK, P. H.
5813*
WIESSLER, M.
5576
WILKINS, S. A.
5758*
WILKINSON, D. I.
5946*
WILKINSON, G. R.
5572
WILLIAMS, J. C.
5478
WILLIAMS, J. F.
5519*, 5686
WILLIAMS, R. C.
5757*
WILLIAMS, R. R.
5855*
WILLIAMS, R. W.
5953*
WILSON, L. S.
5859*
WINTERFELD, G.
5885
WITKOP, C. J.
5790
WITTLIFF, J. L.
5954*
WOCKEL, W.
5891*
WOGON, J.
5604*
WOLFE, H. J.
5906
WOLMAN, M.
5476
WONG, J. J.
5545
WOOD, J. L.
5563
WORTMAN, J.
5941*
WRZOLKOWA, T.
5792
WUNDERLICH, V.
5680
WUST, C. J.
5740
WUTZLER, P.
5694
WYLER, R.
5783
WYNDER, E. L.
5480*
YAGER, J. D.
5468
YAKULIS, V.
5945*
YAM, L. T.
5917
YAMADA, K.
5854*
YANAGI, S.
5468
YOHN, D. S.
5666
YOSHIMURA, H.
5546
YOSHIZAWA, Y.
5499*
YOURTEE, D. M.
5594*
YUSPA, S. H.
5484*
ZACH, J.
5804
ZAHN, R. K.
5983*
ZEUTHEN, J.
5698, 5727
ZIEGLER, R.
5621
ZIMMERMANN, H. P.
5942*
ZINTL, F.
5882

ZOLLER, M.
  5735
ZOLLNER, E. J.
  5983*
ZUR HAUSEN, H.
  5681

* INDICATES A PLAIN CITATION WITHOUT ACCOMPANYING ABSTRACT

CETAMIDE, N-(ACETYLOXY)-N-9H-FLUOREN-2-YL-
  CHROMOSOME ABERRATIONS
    HYPERTENSION, 5595*
  CYCLOHEXIMIDE
    DNA REPAIR, 5550
  DNA REPAIR
    DOSE-RESPONSE STUDY, 5550
    HYPERTENSION, 5595*
  XERODERMA PIGMENTOSUM
    DNA REPAIR, 5622

CETAMIDE, N-FLUOREN-2-YL-
  LIVER NEOPLASMS.
    ADENOSINE TRIPHOSPHATASE, 5579
    GANGLIOSIDES, 5598*
    HYPERPLASIA, 5598*
    LIPIDS, 5598*
    PRECANCEROUS CONDITIONS, 5579
    SIALIC ACIDS, 5598*

ETAMIDE, N-FLUOREN-2-YLDI-
  CHOLANGIOMA
    AGE FACTORS, RAT, 5596*
    SEX FACTORS, RAT, 5596*
  HEPATOMA
    AGE FACTORS, RAT, 5596*
    SEX FACTORS, RAT, 5596*
  LIVER CIRRHOSIS
    AGE FACTORS, RAT, 5596*

ETAMIDE, THIO-
  CYTOCHROME P-450
    MICROSOMES, LIVER, 5551
  ESTRADIOL
    MICROSOMES, LIVER, 5551

ETOHYDROXAMIC ACID, N-FLUOREN-2-YL-
  FREE RADICALS
    CELL TRANSFORMATION, NEOPLASTIC,
      5410

ACETOPHENETIDIDE
  UROGENITAL NEOPLASMS
    EPIDEMIOLOGY, 5893*

ETYLAMINOFLUORENE
  SEE ACETAMIDE, N-FLUOREN-2-YL-

ETYLCHOLINESTERASE
  NEUROBLASTOMA
    AZAQUANINE-RESISTANT MUTANTS, 5796
    THIOGUANINE-RESISTANT MUTANTS,
      5796

ID PHOSPHATASE
  LEUKEMIA, HAIRY CELL
    LYMPHOCYTES, 5804
    LYSOSOMES, 5917
    MICROSOMES, 5917
    SPLEEN, 5917
    TARTARIC ACID, 5804

RIDINE MUSTARD
  THYMIDINE KINASE
    HAPLOID CELLS, 5610*
    MUTAGENIC ACTIVITY, 5610*
  URIDINE, 5-BROMO-2'-DEOXY-
    THYMIDINE KINASE, 5610*

ACROMEGALY
  PITUITARY NEOPLASMS
    CELLULAR INCLUSIONS, 5783
    DNA, 5783
    ULTRASTRUCTURAL STUDY, 5783

ACTIN
  BENZO(A)PYRENE
    IMMUNE SERUMS, 5618*
  CHOLANTHRENE, 3-METHYL-
    IMMUNE SERUMS, 5618*
  CYTOSINE, 1-BETA-D-ARABINOFURANOSYL-
    IMMUNE SERUMS, 5618*

ACTINOMYCIN D
  DNA
    REVIEW, 5426
  LEUKEMIA
    ANTIGEN-ANTIBODY COMPLEX, 5765*
  VIRUS, ROUS SARCOMA
    GLUCOSE, 2-DEOXY-, 5645

ADENOCARCINOMA
  BREAST NEOPLASMS
    ISOANTIGENS, 5449
    LEUKEMIA, MYELOCYTIC, 5814*
  BRONCHIAL NEOPLASMS
    EPIDEMIOLOGY, AUSTRIA, 5873
  CECAL NEOPLASMS
    ANEMIA, HEMOLYTIC, AUTOIMMUNE,
      5810*
    ANTIBODY FORMATION, 5810*
    AUTOANTIBODIES, 5810*
  CELL MEMBRANE
    C-TYPE PARTICLES, 5710*
  CERVIX NEOPLASMS
    4,4'-STILBENEDIOL, ALPHA,ALPHA'-
      DIETHYL-, 5415
  COLONIC NEOPLASMS
    CARCINOEMBRYONIC ANTIGEN, 5753*
  EAR NEOPLASMS
    EPIDEMIOLOGY, USSR, 5876
  ENDOMETRIOSIS
    CASE REPORT, 5825*
  GYNECOLOGIC NEOPLASMS
    4,4'-STILBENEDIOL, ALPHA,ALPHA'-
      DIETHYL-, 5495*
  KIDNEY NEOPLASMS
    CASE REPORT, CHILD, 5851*
    CITRININ, 5578
    NEOPLASM REGRESSION, SPONTANEOUS,
      5849*
  LIVER NEOPLASMS
    BENZENAMINE, N,N-DIMETHYL-4-((3-
      METHYLPHENYL)AZO)-, 5547
  LUNG NEOPLASMS
    EPIDEMIOLOGY, REVIEW, 5480*
  MAMMARY NEOPLASMS, EXPERIMENTAL
    CHOLANTHRENE, 3-METHYL-, 5741
    CHYMOTRYPSIN, 5959*
    COLLAGEN, 5938*
    CONCANAVALIN A, 5959*
    DEOXYRIBONUCLEASE, 5959*
    NEURAMINIDASE, 5745, 5959*
    PAPAIN, 5959*
    PROLINE HYDROXYLASE, 5938*
    PRONASE, 5959*
    RIBONUCLEASE, 5959*
    TRYPSIN, 5959*

  PANCREATIC NEOPLASMS
    THORIUM DIOXIDE, 5625
  4,4'-STILBENEDIOL, ALPHA,ALPHA'-DIETHYL-
    CASE REPORT, 5825*
  STOMACH NEOPLASMS
    UREA, 3-ACETYL-1-METHYL-1-NITROSO-, 5587
  THYROID NEOPLASMS
    ADENYL CYCLASE, 5846*, 5915
    PHOSPHOTRANSFERASES, 5915
    ULTRASTRUCTURAL STUDY, 5845*
  TURNER'S SYNDROME
    CASE REPORT, 5825*
    ENDOMETRIOSIS, 5825*
    4,4'-STILBENEDIOL, ALPHA,ALPHA'-DIETHYL-, 5825*
  VAGINAL NEOPLASMS
    4,4'-STILBENEDIOL, ALPHA,ALPHA'-DIETHYL-, 5415
  VIRUS, C-TYPE RNA TUMOR
    ISOLATION AND CHARACTERIZATION, 5710*
  VIRUS, MURINE LEUKEMIA
    ANTIGENS, VIRAL, 5710*

ADENOCARCINOMA, PAPILLARY
  GALLBLADDER NEOPLASMS
    CASE REPORT, 5861*
    HISTOLOGICAL STUDY, 5861*

ADENOMA
  LIVER NEOPLASMS
    CONTRACEPTIVES, ORAL, 5557
  LUNG NEOPLASMS
    PLUTONIUM, 5627*
  PITUITARY NEOPLASMS
    CELLULAR INCLUSIONS, 5783
    ERGOLINES, 5843*
    LACTATION DISORDERS, 5842*
    ULTRASTRUCTURAL STUDY, 5842*
  PROSTATIC NEOPLASMS
    NEOPLASM TRANSPLANTATION, 5963*
  STOMACH NEOPLASMS
    UREA, 3-ACETYL-1-METHYL-1-NITROSO-, 5587
  THYROID NEOPLASMS
    ADENYL CYCLASE, 5846*
    CASE REPORT, 5844*
    NEOPLASM METASTASIS, 5784
    NEOPLASM RECURRENCE, LOCAL, 5784
    ULTRASTRUCTURAL STUDY, 5845*

ADENOMA, CHROMOPHOBE
  ADENOMA, EOSINOPHILIC
    ULTRASTRUCTURAL STUDY, 5842*
  PITUITARY NEOPLASMS
    CELLULAR INCLUSIONS, 5783
    ULTRASTRUCTURAL STUDY, 5842*

ADENOMA, EOSINOPHILIC
  ADENOMA, CHROMOPHOBE
    ULTRASTRUCTURAL STUDY, 5842*

ADENOSINE CYCLIC 3',5' MONOPHOSPHATE
  BREAST NEOPLASMS
    CARCINOMA, 5820*
  CELL CYCLE KINETICS
    REVIEW, 5474
  CELL MEMBRANE
    REVIEW, 5474
  EPITHELIAL CELLS
    CELL DIFFERENTIATION, 5946*, 597
  HELA CELLS
    CELL CYCLE KINETICS, 5898*
  HEPATOMA
    BINDING SITES, 5912
    METABOLISM, REVIEW, 5478
    PHOSPHOPROTEINS, 5913
    PROTEIN KINASE, 5913
  LEUKEMIA, LYMPHOCYTIC
    SODIUM FLUORIDE, 5730
    THEOPHYLLINE, 5730
  LEUKEMIA, MYELOCYTIC
    SODIUM FLUORIDE, 5730
    THEOPHYLLINE, 5730
  MELANOMA
    MSH, 5952*
    PIGMENTATION, 5835*
  NEUROBLASTOMA
    CELL DIFFERENTIATION, 5965*
  PLANT AGGLUTININS
    LYMPHOCYTE TRANSFORMATION, 5730
  THYROID NEOPLASMS
    ADENYL CYCLASE, 5915
    PHOSPHOTRANSFERASES, 5915

ADENOSINE TRIPHOSPHATASE
  LIVER NEOPLASMS
    ACETAMIDE, N-FLUOREN-2-YL-, 557
    DIETHYLAMINE, N-NITROSO-, 5579
    DIMETHYLAMINE, N-NITROSO-, 5579
    M-TOLUIDINE, N,N-DIMETHYL-4-(PHENYLAZO)-, 5579

ADENYL CYCLASE
  BREAST NEOPLASMS
    CARCINOMA, 5820*
  HEPATOMA
    CATECHOLAMINES, 5957*
    ISOPROTERENOL, 5957*
    PRACTOLOL, 5957*
  THYROID DISEASES
    GOITER, 5846*
  THYROID NEOPLASMS
    ADENOCARCINOMA, 5846*, 5915
    ADENOMA, 5846*
    ADENOSINE CYCLIC 3',5 MONOPHOSPHATE, 5915
    CARCINOMA, PAPILLARY, 5915
    PROSTAGLANDINS E, 5915
    SODIUM FLUORIDE, 5915
    THYROTROPIN, 5915

ADRENAL GLAND NEOPLASMS
  HEMANGIOENDOTHELIOMA
    CASE REPORT, 5841*
    HISTOLOGICAL STUDY, 5841*
  HYPERPLASIA
    GONADECTOMY, MOUSE, 5781

ADRENAL GLANDS
  MAMMARY NEOPLASMS, EXPERIMENTAL
    STRESS, 5604*

AFLATOXIN B1

- RETINOL
  - REVIEW, 5413
- VITAMIN D
  - REVIEW, 5413

AGING
- FIBROBLASTS
  - RNA, MESSENGER, 5928*
  - RNA REPLICATION, 5928*
- LIPIDS
  - AUTOOXIDATION, REVIEW, 5476

ALANINE, 3-(3,4-DIHYDROXYPHENYL)-
- MELANOMA
  - METABOLISM, 5792

ALDEHYDES
- NEOPLASMS, EXPERIMENTAL
  - SULFHYDRYL COMPOUNDS, REVIEW, 5907

ALKALINE PHOSPHATASE
- CELL TRANSFORMATION, NEOPLASTIC
  - ISOLATION AND CHARACTERIZATION, 5988*
- DNA REPLICATION
  - LIVER REGENERATION, 5994*
- KB CELLS
  - ISOLATION AND CHARACTERIZATION, 5988*
- LEUKEMIA
  - DNA REPLICATION, 5994*
- LIVER NEOPLASMS
  - CALCIUM, 5993*
  - CELL LINE, 5993*
  - CELL MEMBRANE, 5993*
  - MAGNESIUM, 5993*
- NUCLEOTIDES
  - LIVER REGENERATION, 5997*
- PLACENTA
  - ISOLATION AND CHARACTERIZATION, 5988*

ALKYLATING AGENTS
- BRAIN NEOPLASMS
  - DNA REPAIR, REVIEW, 5496*
- DNA
  - REVIEW, 5426
- DNA REPAIR
  - CARCINOGENIC ACTIVITY, REVIEW, 5424
  - MUTAGENIC ACTIVITY, REVIEW, 5424

ALLOYS
- MELANOMA
  - SUTURES, 5637*

ALPHA 1 ANTITRYPSIN
- LIVER CIRRHOSIS
  - PROTEINS, 5852*
- LIVER NEOPLASMS
  - PROTEINS, 5852*
- LUNG NEOPLASMS
  - PROTEINS, 5852*
- PULMONARY EMPHYSEMA
  - PROTEINS, 5852*

ALPHA GLOBULINS
- 5ALPHA-ANDROSTAN-3-ONE, 17BETA-HYDROXY-
  - LIVER, RAT, 5975*
- ESTRADIOL
  - LIVER, RAT, 5975*

ALPHA-AMANITINE
- DNA POLYMERASE
  - LIVER REGENERATION, 5991*

AMINES
- UROGENITAL NEOPLASMS
  - EPIDEMIOLOGY, REVIEW, 5537*

AMINO ACID NAPHTHYLAMIDASES
- BUTYRAMIDE, N-FLUOREN-2-YL-
  - HYDROLYSIS, 5597*
- HODGKIN'S DISEASE
  - ISOLATION AND CHARACTERIZATION, 5597*
- INTESTINES
  - ISOLATION AND CHARACTERIZATION, 5597*

AMINO ACIDS
- CARCINOEMBRYONIC ANTIGEN
  - NEOPLASM METASTASIS, 5725
- COLONIC NEOPLASMS
  - CARCINOEMBRYONIC ANTIGEN, 5725
- NEOPLASMS
  - RNA REPLICATION, 5977*
- YEASTS
  - RNA REPLICATION, 5977*

AMINOPTERIN
- LEUKEMIA L1210
  - OXIDOREDUCTASES, 5980*
  - TRANSFERASES, 5981*

AMOSITE
- SEE ASBESTOS

ANDROGENS
- EPIDEMIOLOGY
  - BREAST NEOPLASMS, 5536*

5ALPHA-ANDROSTAN-3-ONE, 17BETA-HYDROXY-
- ALPHA GLOBULINS
  - LIVER, RAT, 5975*
- PITUITARY NEOPLASMS
  - GROWTH, 5552
- RNA, MESSENGER
  - LIVER, RAT, 5975*

ANEMIA
- CARCINOMA, EHRLICH TUMOR
  - EXTRAMEDULLARY TUMOR, 5850*

ANEMIA, APLASTIC
- CELL TRANSFORMATION, NEOPLASTIC
  - GENETICS, 5806
- GASTROINTESTINAL NEOPLASMS
  - GENETICS, 5806
- LYMPHATIC NEOPLASMS
  - GENETICS, 5806

ANEMIA, FANCONI'S
- SEE ANEMIA, APLASTIC

ANEMIA, HEMOLYTIC, AUTOIMMUNE
- CECAL NEOPLASMS

    - ADENOCARCINOMA, 5810*
    - CASE REPORT, 5810*
  - SPLENOMEGALY
    - CASE REPORT, CHRONIC LYMPHADENOPATHY, 5828*

- ANEUPLOIDY
  - CELL TRANSFORMATION, NEOPLASTIC
    - REVIEW, 5457

- ANGIOBLASTOMA
  - SEE ANGIOSARCOMA

- ANGIOSARCOMA
  - BONE NEOPLASMS
    - ETHYLENE, CHLORO-, 5819*
  - ETHYLENE, CHLORO-
    - EPIDEMIOLOGY, ENGLAND, 5871
    - REVIEW, 5405
  - LIVER NEOPLASMS
    - ETHYLENE, CHLORO-, 5819*

- ANILINE, N,N-DIMETHYL-P-PHENYLAZO-
  - HEPATOMA
    - IMMUNITY, CELLULAR, 5735

- ANTHOPHYLLITE
  - SEE ASBESTOS

- 1,8,9-ANTHRACENETRIOL
  - SKIN NEOPLASMS
    - BENZO(A)PYRENE, 5568

- ANTI-ANTIBODIES
  - VIRUS, ADENO 1
    - DEOXYRIBONUCLEASE, 5682

- ANTI-INFLAMMATORY AGENTS
  - HYDROLASES
    - STAPHYLOCOCCUS, 5761*

- ANTIBODIES
  - MYXOMYCETES
    - CELL DIVISION, 5904

- ANTIBODIES, HETEROTYPIC
  - LYMPHOMA
    - HISTOCOMPATIBILITY ANTIGENS, 5724
  - LYMPHOSARCOMA
    - HISTOCOMPATIBILITY ANTIGENS, 5724

- ANTIBODIES, NEOPLASM
  - BREAST NEOPLASMS
    - MONOCYTES, 5772*
  - SARCOMA
    - IMMUNE RESPONSE, 5774*
    - NEOPLASM METASTASIS, 5774*
    - NEOPLASM REGRESSION, SPONTANEOUS, 5746
    - TRANSPLANTATION IMMUNOLOGY, 5746

- ANTIBODIES, VIRAL
  - FIBROSARCOMA
    - VIRUS, GUINEA PIG HERPES, 5664
  - HODGKIN'S DISEASE
    - DIAGNOSIS AND PROGNOSIS, 5747
    - IMMUNITY, CELLULAR, 5747
  - VIRUS, EPSTEIN-BARR
    - BABOON, 5688
  - VIRUS, FELINE LEUKEMIA
    - HORIZONTAL TRANSMISSION, 5665
    - IMMUNE RESPONSE, 5665
  - VIRUS, HERPES
    - BABOON, 5688
  - VIRUS, HERPES SIMPLEX 1
    - IMMUNE RESPONSE, RABBIT, TESTICL 5694
  - VIRUS, HERPES SIMPLEX 2
    - IMMUNE RESPONSE, RABBIT, TESTICL 5694

- ANTIBODY FORMATION
  - CECAL NEOPLASMS
    - ADENOCARCINOMA, 5810*
  - LYMPHOMA
    - IMMUNITY, CELLULAR, 5770*
    - B-LYMPHOCYTES, 5770*
    - T-LYMPHOCYTES, 5770*
    - SPLEEN, 5770*
  - VIRUS, HERPES SIMPLEX 1
    - IMMUNE SERUMS, 5693
    - QUANTITATION, 5693
  - VIRUS, HERPES SIMPLEX 2
    - IMMUNE SERUMS, 5693
    - QUANTITATION, 5693

- ANTIBODY SPECIFICITY
  - GLIOBLASTOMA MULTIFORME
    - REVERSE TRANSCRIPTASE, 5717*
  - LEUKEMIA
    - REVERSE TRANSCRIPTASE, 5717*
  - LEUKEMIA, MYELOCYTIC
    - CHROMOSOMES, HUMAN, 21-22, 5740
    - LEUKEMIA, MYELOBLASTIC, 5740
  - MELANOMA
    - REVERSE TRANSCRIPTASE, 5717*

- ANTIGEN-ANTIBODY COMPLEX
  - BREAST NEOPLASMS
    - MONOCYTES, 5772*
  - LEUKEMIA
    - ACTINOMYCIN D, 5765*
    - CELL MEMBRANE, 5765*
    - DRUGS, ANTIMITOTIC, 5765*
    - IMMUNE SERUMS, 5765*
  - LYMPHOCYTES
    - IMMUNITY, CELLULAR, REVIEW, 5446
    - SURFACE PROPERTIES, 5766*
  - MACROPHAGES
    - SURFACE PROPERTIES, 5766*

- ANTIGEN-ANTIBODY REACTIONS
  - BENZO(A)PYRENE
    - CELL TRANSFORMATION, NEOPLASTIC, 5618*
  - BREAST NEOPLASMS
    - LEUKOCYTE ADHERENCE INHIBITION, 5772*
  - CELL TRANSFORMATION, NEOPLASTIC
    - IMMUNE RESPONSE, REVIEW, 5444
  - CHOLANTHRENE, 3-METHYL-
    - CELL TRANSFORMATION, NEOPLASTIC, 5618*
  - CYTOSINE, 1-BETA-D-ARABINOFURANOSYL-
    - CELL TRANSFORMATION, NEOPLASTIC, 5618*
  - HEPATOMA
    - AUSTRALIA ANTIGEN, 5690

- HODGKIN'S DISEASE
  - IMMUNOGLOBULINS, SURFACE, 5726
- B-LYMPHOCYTES
  - HISTOCOMPATIBILITY ANTIGENS, 5767*
  - ISOANTIGENS, 5767*
- SARCOMA, RETICULUM CELL
  - IMMUNOGLOBULINS, SURFACE, 5726
- VIRUS, CYTOMEGALO
  - CELL TRANSFORMATION, NEOPLASTIC, 5692
- VIRUS, FRIEND MURINE LEUKEMIA
  - ASCITIC FLUID, 5750
  - CELL TRANSFORMATION, NEOPLASTIC, 5653
- VIRUS, HERPES SIMPLEX
  - CELL TRANSFORMATION, NEOPLASTIC, 5692
- VIRUS, MURINE LEUKEMIA
  - FERRITIN, 5703*
  - IMMUNE SERUMS, 5703*

IGENIC DETERMINANTS
- LEUKEMIA, MYELOCYTIC
  - LEUKEMIA, MYELOBLASTIC, 5740
- MELANOMA
  - GLIOBLASTOMA MULTIFORME, 5717*
  - LEUKEMIA, 5717*
- NEOPLASMS
  - MACROPHAGE ELECTROPHORETIC MOBILITY TEST, 5743
- NEOPLASMS, EXPERIMENTAL
  - HYBRID CELLS, 5450, 5764*
- ONCOGENIC VIRUSES
  - VIRUS REPLICATION, REVIEW, 5518*
- VIRUS, AVIAN LEUKOSIS-SARCOMA
  - DNA, VIRAL, 5642
  - VIRUS, ROUS SARCOMA, 5642
- VIRUS, AVIAN MYELOBLASTOSIS
  - REVIEW, 5529*
- VIRUS, C-TYPE RNA TUMOR
  - MOUSE, WILD, REVIEW, 5649
- VIRUS, FELINE LEUKEMIA
  - REVIEW, 5529*
- VIRUS, FRIEND MURINE LEUKEMIA
  - IMMUNITY, CELLULAR, 5756*
  - REVIEW, 5529*
- VIRUS, RNA TUMOR
  - IMMUNE RESPONSE, 5520*

IGENS
- CELL MEMBRANE
  - CELL DIFFERENTIATION, 5507*
  - CELL TRANSFORMATION, NEOPLASTIC, REVIEW, 5442
- LEUKEMIA
  - CELL MEMBRANE, 5760*
- B-LYMPHOCYTES
  - IMMUNE RESPONSE, REVIEW, 5447
- T-LYMPHOCYTES
  - IMMUNE RESPONSE, REVIEW, 5447

TIGENS, HETEROGENETIC
- VIRUS, FRIEND MURINE LEUKEMIA
  - REVIEW, 5452

TIGENS, NEOPLASM
- BLADDER NEOPLASMS
  - IMMUNE RESPONSE, REVIEW, 5773*
- BRAIN NEOPLASMS
  - CELL MIGRATION INHIBITION, 5733
  - IMMUNITY, CELLULAR, 5733
- CELL TRANSFORMATION, NEOPLASTIC
  - IMMUNE RESPONSE, REVIEW, 5445
- HEPATOMA
  - IMMUNITY, CELLULAR, 5735
- IMMUNE SERUMS
  - IMMUNITY, CELLULAR, REVIEW, 5446
- LEUKEMIA
  - IMMUNE SERUMS, 5760*
- LEUKEMIA, MYELOBLASTIC
  - LYMPHOCYTE TRANSFORMATION, 5759*
- LEUKEMIA, MYELOCYTIC
  - CHROMOSOMES, HUMAN, 21-22, 5740
  - IMMUNE SERUMS, 5740
- MAMMARY NEOPLASMS, EXPERIMENTAL
  - IMMUNITY, CELLULAR, 5739
  - VIRUS, MURINE MAMMARY TUMOR, 5739
- MELANOMA
  - DIAGNOSIS AND PROGNOSIS, 5734
  - HYPERSENSITIVITY, DELAYED, 5723
  - IMMUNITY, CELLULAR, 5734
  - ISOLATION AND CHARACTERIZATION, 5723
- SARCOMA
  - IMMUNITY, CELLULAR, 5735
- VIRUS, MURINE MAMMARY TUMOR
  - NEURAMINIDASE, 5745
- VIRUS, ROUS SARCOMA
  - ISOLATION AND CHARACTERIZATION, 5505*

ANTIGENS, VIRAL
- ADENOCARCINOMA
  - VIRUS, MURINE LEUKEMIA, 5710*
- FIBROSARCOMA
  - VIRUS, GUINEA PIG HERPES, 5664
- HELA CELLS
  - VIRUS, MASON-PFIZER MONKEY, 5716*
- HODGKIN'S DISEASE
  - DIAGNOSIS AND PROGNOSIS, 5747
  - IMMUNITY, CELLULAR, 5747
  - VIRUS, EPSTEIN-BARR, 5747
- TERATOID TUMOR
  - VIRUS, ADENO 2, 5684
- VIRUS, HERPES SIMPLEX 2
  - CELL TRANSFORMATION, NEOPLASTIC, 5691
- VIRUS, POLYOMA
  - VIRUS, ADENO 2, 5684
- VIRUS, RAUSCHER MURINE LEUKEMIA
  - ISOLATION AND CHARACTERIZATION, 5660
- VIRUS, SV40
  - CELL TRANSFORMATION, NEOPLASTIC, 5667
  - KETONES, 5667
  - RNA, MESSENGER, 5667
  - VIRUS, ADENO 2, 5684

ANTILYMPHOCYTE SERUM
- LUNG NEOPLASMS
  - T-LYMPHOCYTES, 5755*
- MELANOMA
  - GROWTH, 5833*
  - T-LYMPHOCYTES, 5833*

ANTINEOPLASTIC AGENTS
- CENTRAL NERVOUS SYSTEM

- SIDE EFFECTS, REVIEW, 5408
  - LEUKEMIA L1210
    - TRANSFERASES, 5981*
  - NEOPLASMS
    - CARCINOGENIC POTENTIAL, REVIEW, 5408

- ANTISERUM
  - SEE IMMUNE SERUMS

- ARECA
  - LEUKOPLAKIA, ORAL
    - EPIDEMIOLOGY, INDIA, 5890*

- ARRHENOBLASTOMA
  - OVARIAN NEOPLASMS
    - CASE REPORT, 5778
    - HISTOLOGICAL STUDY, 5778

- ARSENIC
  - ENVIRONMENTAL HAZARD
    - CARCINOGENIC POTENTIAL, REVIEW, 5489*
  - SKIN NEOPLASMS
    - DNA REPAIR, REVIEW, 5407

- ARTERIOSCLEROSIS
  - SMOKING
    - AORTA, 5487*

- ARYL HYDROCARBON HYDROXYLASES
  - BENZ(A)ANTHRACENE
    - CHROMOSOMES, 5570
    - EPITHELIAL CELLS, 5548
    - LIVER, RAT, 5570
  - BENZ(A)ANTHRACENE, 7,12-DIMETHYL-
    - CELL TRANSFORMATION, NEOPLASTIC, 5569
    - EPIDERMIS, MOUSE, 5569
    - EPITHELIAL CELLS, 5548
  - BENZO(A)PYRENE
    - CELL TRANSFORMATION, NEOPLASTIC, 5569
    - EPIDERMIS, MOUSE, 5569
  - BENZO(B)TRIPHENYLENE
    - CELL TRANSFORMATION, NEOPLASTIC, 5569
  - CHOLANTHRENE, 3-METHYL-
    - CELL TRANSFORMATION, NEOPLASTIC, 5569
    - EPIDERMIS, MOUSE, 5569
    - EPITHELIAL CELLS, 5548
  - DIBENZ(A,H)ANTHRACENE
    - CELL TRANSFORMATION, NEOPLASTIC, 5569
    - EPITHELIAL CELLS, 5548
  - LARYNGEAL NEOPLASMS
    - CHOLANTHRENE, 3-METHYL-, 5600*
    - LYMPHOCYTES, 5600*
    - SMOKING, 5600*
  - POLYCYCLIC HYDROCARBONS
    - EPITHELIAL CELLS, 5548
  - RADIATION, IONIZING
    - CHOLANTHRENE, 3-METHYL-, 5640*
    - MOUSE, 5640*

- ASBESTOS
  - GASTROINTESTINAL NEOPLASMS
    - EPIDEMIOLOGY, REVIEW, 5486*
  - LUNG NEOPLASMS
    - EPIDEMIOLOGY, REVIEW, 5486*
  - MESOTHELIOMA
    - EPIDEMIOLOGY, REVIEW, 5486*
  - PNEUMOCONIOSIS
    - EPIDEMIOLOGY, REVIEW, 5486*

- ASBESTOSIS
  - LUNG NEOPLASMS
    - CARCINOMA, 5802
    - CASE REPORT, 5802
    - MESOTHELIOMA, 5802
    - OCCUPATIONAL HAZARD, 5802
    - SMOKING, 5802

- ASCITIC FLUID
  - VIRUS, FRIEND MURINE LEUKEMIA
    - ANTIGEN-ANTIBODY REACTIONS, 575
    - IMMUNE RESPONSE, 5750
    - MONOCYTES, SPLEEN, 5750

- ASCORBIC ACID
  - MAMMARY NEOPLASMS, EXPERIMENTAL
    - STRESS, 5604*

- ASTROCYTOMA
  - BRAIN NEOPLASMS
    - SENKIRKINE, HYDROXY-, 5416
    - VIRUS, B77, 5733
  - CEREBELLAR NEOPLASMS
    - DIAGNOSIS, DIFFERENTIAL, 5530*
    - HISTOLOGICAL STUDY, REVIEW, 553
  - NERVOUS SYSTEM NEOPLASMS
    - UREA, 3-ACETYL-1-METHYL-1-NITRO 5587

- ATAXIA TELANGIECTASIA
  - CELL TRANSFORMATION, NEOPLASTIC
    - EPIDEMIOLOGY, REVIEW, 5455
    - GENETICS, 5806
  - CHROMOSOME ABERRATIONS
    - LYMPHOCYTES, REVIEW, 5455
  - GASTROINTESTINAL NEOPLASMS
    - GENETICS, 5806
  - LYMPHATIC NEOPLASMS
    - GENETICS, 5806

- ATOMIC WARFARE
  - LEUKEMIA
    - DOSE-RESPONSE STUDY, REVIEW, 54

- AUSTRALIA ANTIGEN
  - HEPATITIS, INFECTIOUS
    - EPIDEMIOLOGY, SOUTH VIETNAM, 58
    - FETAL GLOBULINS, 5875
  - HEPATOMA
    - ANTIGEN-ANTIBODY REACTIONS, 569
    - BANTUS, 5690
    - EPIDEMIOLOGY, SOUTH VIETNAM, 58
    - FETAL GLOBULINS, 5690, 5875
    - TISSUE CULTURE, 5722*
    - VIRUS REPLICATION, 5722*
  - MALARIA
    - EPIDEMIOLOGY, SOUTH VIETNAM, 58
    - FETAL GLOBULINS, 5875

- AUTOANTIBODIES
  - CECAL NEOPLASMS
    - ADENOCARCINOMA, 5810*

  IGG, 5810*

SOME ABNORMALITIES
COLONIC NEOPLASMS
    CASE REPORT, 5829*

ERIA
-CYCLOHEXENE-1,2-DICARBOXIMIDE, N-
  (TRICHLOROMETHYL)THIO-
    MUTAGENIC ACTIVITY, REVIEW, 5420

TURIC ACID, 5-ETHYL-5-PHENYL-
LOOD CIRCULATION
    LIVER, RAT, 5572
IEPATOMA
    TRANSFERASES, 5565
IYDROXYLASES
    GENETICS, MOUSE, 5571
XIDOREDUCTASES
    MUTAGENIC ACTIVITY, REVIEW, 5421

/ACCINATION
IELANOMA
    MEMBRANE POTENTIALS, 5744

A)ANTHRACENE
RYL HYDROCARBON HYDROXYLASES
    EPITHELIAL CELLS, 5548
    LIVER, RAT, 5570
HROMOSOMES
    ARYL HYDROCARBON HYDROXYLASES,
      5570

A)ANTHRACENE-7,12-DIMETHANOL
KIN
    FLUORESCENCE, MOUSE, 5562

A)ANTHRACENE, 7,12-DIMETHYL-
RYL HYDROCARBON HYDROXYLASES
    EPIDERMIS, MOUSE, 5569
    EPITHELIAL CELLS, 5548
ARCINOGENIC METABOLITE
    ISOLATION AND CHARACTERIZATION,
      5564
ELL TRANSFORMATION, NEOPLASTIC
    ARYL HYDROCARBON HYDROXYLASES,
      5569
    ULTRASTRUCTURAL STUDY, MOUSE
      EMBRYO, 5603*
NA
    BINDING, LYMPHOCYTES, 5595*
    HYPERTENSION, 5595*
REE RADICALS
    CELL TRANSFORMATION, NEOPLASTIC,
      5410
ANGLIOSIDES
    CELL TRANSFORMATION, NEOPLASTIC,
      5603*
LYCERALDEHYDEPHOSPHATE DEHYDROCENASE
    BINDING, RAT MAMMARY TISSUE, 5563
-REGION EPOXIDES
    ISOLATION AND CHARACTERIZATION,
      5564
IAMMARY NEOPLASMS, EXPERIMENTAL
    STRESS, 5604*
KIN
    FLUORESCENCE, MOUSE, 5562
IRUS-LIKE PARTICLES
    MAMMARY NEOPLASMS, EXPERIMENTAL,
      5707*

BENZ(A)ANTHRACENE-7-METHANOL, 12-METHYL-
  SKIN
    FLUORESCENCE, MOUSE, 5562

BENZ(A)ANTHRACENE, 7-(METHOXYMETHYL)-12-
  METHYL-
  GLYCERALDEHYDEPHOSPHATE DEHYDROGENASE
    BINDING, RAT MAMMARY TISSUE, 5563

BENZENAMINE, N,N-DIMETHYL-4-((3-
  METHYLPHENYL)AZO)-
  LIVER NEOPLASMS
    ADENOCARCINOMA, 5547
    CATALASE, 5547
    ORGANOIDS, 5547
    PROPIONIC ACID, 2-(P-CHLOROPHENOZY)
      -2-METHYL-, ETHYL ESTER, 5547
    ULTRASTRUCTURAL STUDY, 5547

BENZIDINE
  BLADDER NEOPLASMS
    EPIDEMIOLOGY, REVIEW, 5488*

BENZO(A)PYREN-6-OL
  FREE RADICALS
    CELL TRANSFORMATION, NEOPLASTIC,
      5410

BENZO(A)PYRENE
  ACTIN
    IMMUNE SERUMS, 5618*
  ANTIGEN-ANTIBODY REACTIONS
    CELL TRANSFORMATION, NEOPLASTIC,
      5618*
  ARYL HYDROCARBON HYDROXYLASES
    EPIDERMIS, MOUSE, 5569
  BLOOD CIRCULATION
    LIVER, RAT, 5572
  BRONCHI
    METABOLISM, RAT AND HAMSTER, 5567
  CELL DIVISION
    LIVER, MOUSE, 5599*
  CELL SURVIVAL
    LIVER, MOUSE, 5599*
  CELL TRANSFORMATION, NEOPLASTIC
    ARYL HYDROCARBON HYDROXYLASES,
      5569
    MUTAGENIC ACTIVITY, HAMSTER EMBRYO,
      5619*
  DNA
    REVIEW, 5426
  ESTRADIOL
    DNA REPLICATION, 5666
  IMMUNE SERUMS
    CELL TRANSFORMATION, NEOPLASTIC,
      5618*
  LUNG NEOPLASMS
    METABOLISM, RAT AND HAMSTER, 5567
  SKIN NEOPLASMS
    1,8,9-ANTHRACENETRIOL, 5568
    DECANE, 5568
    ESCULIN, 5568
    9-OCTADECENOIC ACID, 5568
    PYRENE, 5568
    PYROCATECHOL, 5568
    PYROGALLOL, 5568
    SQUALENE, 5568

- 12-O-TETRADECANOYLPHORBOL-13-ACETATE, 5568
- TRACHEA
  - METABOLISM, RAT AND HAMSTER, 5567
- VIRAL VACCINES
  - CELL TRANSFORMATION, NEOPLASTIC, 5566
  - VIRUS, FRIEND MURINE LEUKEMIA, 5566
  - VIRUS, ROUS SARCOMA, 5566
- VIRUS, FRIEND MURINE LEUKEMIA
  - VIRAL VACCINES, 5566
- VIRUS, ROUS SARCOMA
  - VIRAL VACCINES, 5566
- VIRUS, SV40
  - DNA REPLICATION, 5666

- BENZO(B)TRIPHENYLENE
  - CELL TRANSFORMATION, NEOPLASTIC
    - ARYL HYDROCARBON HYDROXYLASES, 5569

- 5,6-BENZOFLAVONE
  - HYDROXYLASES
    - GENETICS, MOUSE, 5571

- 7,8-BENZOFLAVONE
  - HYDROXYLASES
    - GENETICS, MOUSE, 5571

- BENZOIC ACID, P-AMINO-, 2-(DIETHYLAMINO)ETHYL ESTER
  - MAMMARY NEOPLASMS, EXPERIMENTAL
    - PRECANCEROUS CONDITIONS, 5561

- BENZOPYRENE HYDROXYLASE
  - SEE ALSO HYDROXYLASES/ARYL HYDROCARBON HYDROXYLASE

- 1,2,3-BENZOTHIADIAZOLE, 6-NITRO-
  - ETHYLENE, CHLORO-
    - METABOLISM, RAT, 5592

- BERYLLIUM
  - DNA REPLICATION
    - MUTAGENIC ACTIVITY, 5611*
  - ENVIRONMENTAL HAZARD
    - CARCINOGENIC POTENTIAL, REVIEW, 5489*
  - VIRUS, AVIAN MYELOBLASTOSIS
    - DNA NUCLEOTIDYLTRANSFERASES, 5611*

- BIPHENYL, 4-NITRO-
  - BLADDER NEOPLASMS
    - EPIDEMIOLOGY, REVIEW, 5488*

- 4-BIPHENYLAMINE
  - BLADDER NEOPLASMS
    - EPIDEMIOLOGY, REVIEW, 5488*

- BLADDER NEOPLASMS
  - ANTIGENS, NEOPLASM
    - IMMUNE RESPONSE, REVIEW, 5773*
  - BENZIDINE
    - EPIDEMIOLOGY, REVIEW, 5488*
  - BIPHENYL, 4-NITRO-
    - EPIDEMIOLOGY, REVIEW, 5488*
  - 4-BIPHENYLAMINE
    - EPIDEMIOLOGY, REVIEW, 5488*
  - BRACKEN FERN
    - HISTOLOGICAL STUDY, CATTLE, TURK 5549
  - CARCINOMA
    - BRACKEN FERN, 5549
    - EPIDEMIOLOGY, CATTLE, 5549
  - CARCINOMA IN SITU
    - IMMUNE RESPONSE, REVIEW, 5773*
  - CARCINOMA, TRANSITIONAL CELL
    - CELL DIFFERENTIATION, 5798
    - CHROMATIN, 5798
    - DNA, 5798
    - NUCLEIC ACIDS, 5937*
    - PYRIMIDINES, 5937*
  - CELLS, CULTURED
    - BLOCKING FACTORS, 5729
  - HEMATURIA
    - HISTOLOGICAL STUDY, CATTLE, TURK 5549
  - 2-IMIDAZOLIDINONE, 1-(5-NITRO-2-THIAZOLYL)-
    - ULTRASTRUCTURAL STUDY, MOUSE, 55
  - LEUKOCYTE CULTURE TEST, MIXED
    - DIAGNOSIS AND PROGNOSIS, REVIEW, 5862*
  - LYMPH NODES
    - IMMUNE RESPONSE, REVIEW, 5862*
  - LYMPHOCYTES
    - IMMUNE RESPONSE, REVIEW, 5862*
    - IMMUNOSUPPRESSION, 5729
    - MICROCYTOTOXICITY ASSAY, REVIEW, 5773*
  - MACROPHAGES
    - IMMUNOSUPPRESSION, 5729
  - 1-NAPHTHYLAMINE
    - EPIDEMIOLOGY, REVIEW, 5488*
  - 2-NAPHTHYLAMINE
    - EPIDEMIOLOGY, REVIEW, 5488*
  - NEOPLASM METASTASIS
    - IMMUNE RESPONSE, REVIEW, 5773*
  - NEOPLASMS, EMBRYONAL AND MIXED
    - BRACKEN FERN, 5549
    - EPIDEMIOLOGY, CATTLE, 5549
  - OCCUPATIONAL HAZARD
    - EPIDEMIOLOGY, REVIEW, 5488*
  - PAPILLOMA
    - BRACKEN FERN, 5549
    - EPIDEMIOLOGY, CATTLE, 5549

- BLOOD CIRCULATION
  - BARBITURIC ACID, 5-ETHYL-5-PHENYL-
    - LIVER, RAT, 5572
  - BENZO(A)PYRENE
    - LIVER, RAT, 5572
  - CHOLANTHRENE, 3-METHYL-
    - LIVER, RAT, 5572
  - VALERIC ACID, 2,2-DIPHENYL-, 2-(DIETHYLAMINO)ETHYL ESTER HCL
    - LIVER, RAT, 5572

- BLOOD COAGULATION
  - LYMPHOMA
    - CELL TRANSFORMATION, NEOPLASTIC, 5676
    - ONCOGENIC VIRUSES, 5676

- BLOOD VESSELS
  - COBALT RADIOISOTOPES
    - ULTRASTRUCTURAL STUDY, RAT, 562

- NEUTRONS
    - ULTRASTRUCTURAL STUDY, RAT, 5626*

ONE MARROW CELLS
- ERYTHREMIC MYELOSIS
    - CASE REPORT, 5827*
    - DNA, 5827*
- LEUKEMIA
    - CELL DIFFERENTIATION, 5902
    - ENZYMATIC ACTIVITY, 5902
- LEUKEMIA, MYELOCYTIC
    - CHROMOSOME ABERRATIONS, 5807
    - KARYOTYPING, 5807

ONE NEOPLASMS
- ANGIOSARCOMA
    - ETHYLENE, CHLORO-, 5819*
- ANIMALS, DOMESTIC
    - EPIDEMIOLOGY, REVIEW, 5525*
    - HISTOLOGICAL STUDY, REVIEW, 5525*
- DOG
    - EPIDEMIOLOGY, REVIEW, 5525*
    - HISTOLOGICAL STUDY, REVIEW, 5525*
- ETHYLENE, CHLORO-
    - CASE REPORT, 5819*
- FIBROSARCOMA
    - TRANSPLANTATION, HOMOLOGOUS, 5930*
- GIANT CELL TUMORS
    - TRANSPLANTATION, HOMOLOGOUS, 5930*
- RADIATION, IONIZING
    - HISTOLOGICAL STUDY, REVIEW, 5491*
- RADIOISOTOPES
    - DOSE-RESPONSE STUDY, REVIEW, 5491*
    - HISTOLOGICAL STUDY, REVIEW, 5491*
- RNA, VIRAL
    - ISOLATION AND CHARACTERIZATION, REVIEW, 5524*
- TRANSPLANTATION, HOMOLOGOUS
    - CRITERIA, 5930*
- VIRUS, C-TYPE RNA TUMOR
    - HISTOLOGICAL STUDY, REVIEW, 5491*
- VIRUS-LIKE PARTICLES
    - ISOLATION AND CHARACTERIZATION, REVIEW, 5524*
- VIRUS, MURINE SARCOMA
    - ISOLATION AND CHARACTERIZATION, REVIEW, 5524*

ACKEN FERN
- BLADDER NEOPLASMS
    - CARCINOMA, 5549
    - HISTOLOGICAL STUDY, CATTLE, TURKEY, 5549
    - NEOPLASMS, EMBRYONAL AND MIXED, 5549
    - PAPILLOMA, 5549

AIN NEOPLASMS
- ALKYLATING AGENTS
    - DNA REPAIR, REVIEW, 5496*
- ANTIGENS, NEOPLASM
    - CELL MIGRATION INHIBITION, 5733
    - IMMUNITY, CELLULAR, 5733
- ASTROCYTOMA
    - SENKIRKINE, HYDROXY-, 5416
    - VIRUS, B77, 5733
- GLIOMA
    - CASE REPORT, INFANT, 5847*
- SARCOMA
    - VIRUS, B77, 5733
- SENKIRKINE, HYDROXY-
    - CARCINOGENIC ACTIVITY, RAT, 5416
- UREA, ETHYL NITROSO-
    - TRANSPLACENTAL CARCINOGENESIS, 5589
    - UREA, METHYL NITROSO-, 5589
- UREA, METHYL NITROSO-
    - MICROCEPHALY, 5589
    - TRANSPLACENTAL CARCINOGENESIS, 5589

BREAST
- CORTISOL
    - DNA REPLICATION, 5560
    - ULTRASTRUCTURAL STUDY, 5560
- INSULIN
    - DNA REPLICATION, 5560
    - ULTRASTRUCTURAL STUDY, 5560
- PROLACTIN
    - CELL DIVISION, 5560
    - DNA REPLICATION, 5560
    - PHOSPHOPROTEINS, 5560
    - ULTRASTRUCTURAL STUDY, 5560

BREAST NEOPLASMS
- ADENOCARCINOMA
    - ISOANTIGENS, 5449
    - LEUKEMIA, MYELOCYTIC, 5814*
- ANDROGENS
    - EPIDEMIOLOGY, 5536*
- ANTIGEN-ANTIBODY REACTIONS
    - LEUKOCYTE ADHERENCE INHIBITION, 5772*
- CARCINOEMBRYONIC ANTIGEN
    - SERUM LEVELS, 5753*
- CARCINOMA
    - ADENOSINE CYCLIC 3',5' MONOPHOSPHATE, 5820*
    - ADENYL CYCLASE, 5820*
    - ENZYMATIC ACTIVITY, 5820*
    - PHOSPHODIESTERASES, 5820*
    - PROTEIN KINASE, 5820*
- CARCINOMA, DUCTAL
    - EPIDEMIOLOGY, MALE, REIVEW, 5460
    - ISOANTIGENS, 5449
    - LEUKEMIA, MYELOCYTIC, 5814*
    - RADIATION, IONIZING, 5499*
- CARCINOMA IN SITU
    - ISOANTIGENS, 5449
- CELL AGGREGATION
    - ULTRASTRUCTURAL STUDY, 5821*
- CELL MEMBRANE
    - CELL AGGREGATION, 5821*
- CONTRACEPTIVES, ORAL
    - EPIDEMIOLOGY, REVIEW, 5417
    - HISTOLOGICAL STUDY, REVIEW, 5494*
    - REVIEW, 5423
- DRUG THERAPY
    - PROGNOSIS, MALE, REVIEW, 5460
- ESTROGENS
    - EPIDEMIOLOGY, 5536*
    - REVIEW, 5423
- ETHYL ALCOHOL
    - EPIDEMIOLOGY, 5593
- GOITER, ENDEMIC
    - EPIDEMIOLOGY, AFRICA, 5535*
- INCIDENCE RATES
    - AFRICA, 5535*

- ISOANTIGENS
  - ISOLATION AND CHARACTERIZATION, REVIEW, 5449
- LEUKEMIA, MYELOCYTIC
  - CASE REPORT, 5814*
  - CHROMOSOMES, HUMAN, 21-22, 5814*
- LYMPHOCYTES
  - NUCLEOTIDES, CYCLIC, 5758*
- LYMPHOSARCOMA
  - HISTOLOGICAL STUDY, 5812*
- MONOCYTES
  - ANTIBODIES, NEOPLASM, 5772*
  - ANTIGEN-ANTIBODY COMPLEX, 5772*
- NEOPLASMS, CONNECTIVE TISSUE
  - HISTOLOGICAL STUDY, 5780
  - ULTRASTRUCTURAL STUDY, 5782
- PERSONALITY
  - EPIDEMIOLOGY, 5992*
- PRECANCEROUS CONDITIONS
  - ELASTIC TISSUE, 5780
  - ENZYMATIC ACTIVITY, 5820*
- RADIATION, IONIZING
  - DOSE-RESPONSE STUDY, REVIEW, 5499*
  - EPIDEMIOLOGY, REVIEW, 5499*
- RESERPINE
  - EPIDEMIOLOGY, 5558
  - ISOLATION AND CHARACTERIZATION, 5414
  - MENOPAUSE, 5558
- STEROIDS
  - EPIDEMIOLOGY, MALE, REIVEW, 5460
- SURGERY, OPERATIVE
  - PROGNOSIS, MALE, REVIEW, 5460
- TRANSPLANTATION, HETEROLOGOUS
  - IMMUNOSUPPRESSION, 5768*
- VIRUS, MASON-PFIZER MONKEY
  - RISK FACTORS, 5536*
  - RNA, 5536*
- VIRUS, MURINE MAMMARY TUMOR
  - RISK FACTORS, 5536*
  - RNA, 5536*
- VIRUS, RNA TUMOR
  - CARCINOGENIC POTENTIAL, REVIEW, 5432

BRONCHI
- BENZO(A)PYRENE
  - METABOLISM, RAT AND HAMSTER, 5567

BRONCHIAL NEOPLASMS
- ADENOCARCINOMA
  - EPIDEMIOLOGY, AUSTRIA, 5873
- CARCINOMA, EPIDERMOID
  - EPIDEMIOLOGY, AUSTRIA, 5873

BRONCHITIS
- OCCUPATIONAL HAZARD
  - FIBROUS GLASS, 5869

BURKITT'S LYMPHOMA
- CHROMOSOME ABERRATIONS
  - CELL TRANSFORMATION, NEOPLASTIC, REVIEW, 5439
- DNA, VIRAL
  - CELL TRANSFORMATION, NEOPLASTIC, REVIEW, 5439
- B-LYMPHOCYTES
  - LYMPHOBLASTOGENESIS INHIBITION FACTOR, 5754*
- RNA, TRANSFER, METHYLTRANSFERASES
  - REVIEW, 5978*
- VIRUS, EPSTEIN-BARR
  - ANTIGEN-ANTIBODY REACTIONS, REVIEW, 5441
  - CARCINOGENIC POTENTIAL, REVIEW, 5433
  - CELL TRANSFORMATION, NEOPLASTIC, REVIEW, 5439
  - DNA, VIRAL, REVIEW, 5689
- VIRUS, FELINE SARCOMA
  - DNA-RNA HYBRIDIZATION, 5655
- VIRUS, MURINE LEUKEMIA
  - DNA-RNA HYBRIDIZATION, 5655
- VIRUS, MURINE SARCOMA
  - DNA-RNA HYBRIDIZATION, 5655
- VIRUS, RD-114
  - DNA-RNA HYBRIDIZATION, 5655
- VIRUS, SIMIAN SARCOMA
  - DNA-RNA HYBRIDIZATION, 5655

BUTANE, 1,2:3,4-DIEPOXY-
- HELA CELLS
  - DNA REPAIR, 5586

BUTYRAMIDE, N-FLUOREN-2-YL-
- AMINO ACID NAPHTHYLAMIDASES
  - HYDROLYSIS, 5597*

BUTYRIC ACID, 2-AMINO-4-(ETHYLTHIO)-
- LIVER NEOPLASMS
  - PRECANCEROUS CONDITIONS, 5579

BUTYRIC ACID, 2-AMINO-4-MERCAPTO-
- CARCINOMA 256, WALKER
  - METHIONINE, 5936*
  - METHYLTRANSFERASES, 5936*
- VIRUS, SV40
  - METHIONINE, 5936*

BUTYRIC ACID, SODIUM SALT
- NEUROBLASTOMA
  - CARBOXY-LYASES, 5986*

CADMIUM
- ENVIRONMENTAL HAZARD
  - CARCINOGENIC POTENTIAL, REVIEW, 5489*
- PLACENTA
  - SPECTROPHOTOMETRIC STUDY, 5887*

CAFFEINE
- VIRUS, SV40
  - CELL TRANSFORMATION, NEOPLASTIC, 5668

CALCITONIN
- THYMUS NEOPLASMS
  - CARCINOID TUMOR, 5906

CALCIUM
- LIVER NEOPLASMS
  - ALKALINE PHOSPHATASE, 5993*
- PHOSPHODIESTERASES
  - CELL TRANSFORMATION, NEOPLASTIC, 5987*

CANCER
- SEE NEOPLASMS (GENERAL AND UNSPECIFIE

- CARBAMIC ACID, ETHYL ESTER
  - CELL TRANSFORMATION, NEOPLASTIC
    - DOSE-RESPONSE STUDY, REVIEW, 5483*
  - DNA
    - BINDING, LIVER, MOUSE, 5585
    - HEPATECTOMY, 5585

- CARBOHYDRATES
  - CONCANAVALIN A
    - CELL MEMBRANE, 5909
  - HEPATOMA
    - METABOLISM, REVIEW, 5478
  - LEUKEMIA L1210
    - IMMUNE RESPONSE, 5933*

- CARBOXY-LYASES
  - LIVER
    - CELLS, CULTURED, 5468
  - MYXOMYCETES
    - CELL CYCLE KINETICS, 5985*
  - NEUROBLASTOMA
    - BUTYRIC ACID, SODIUM SALT, 5986*
    - DIBUTYRYL CYCLIC AMP, 5986*
    - ISOQUINOLINE, 6,7-DIMETHOXY-1-VERATRYL-, 5986*
    - THEOPHYLLINE, 5986*

- CARCINOEMBRYONIC ANTIGEN
  - AMINO ACIDS
    - NEOPLASM METASTASIS, 5725
  - BREAST NEOPLASMS
    - SERUM LEVELS, 5753*
  - COLITIS, ULCERATIVE
    - SERUM LEVELS, 5753*
  - COLONIC NEOPLASMS
    - ADENOCARCINOMA, 5753*
    - AMINO ACIDS, 5725
  - GASTROINTESTINAL NEOPLASMS
    - SERUM LEVELS, 5753*
  - HEPATOMA
    - IMMUNITY, CELLULAR, 5735
  - HISTOCOMPATIBILITY ANTIGENS
    - ANTIGENIC DETERMINANTS, REVIEW, 5448
  - LIVER DISEASES
    - SERUM LEVELS, 5753*
  - LUNG DISEASES
    - SERUM LEVELS, 5753*
  - LUNG NEOPLASMS
    - SERUM LEVELS, 5753*
  - MULTIPLE MYELOMA
    - SERUM LEVELS, 5753*
  - PANCREATITIS
    - SERUM LEVELS, 5753*
  - SARCOMA
    - IMMUNITY, CELLULAR, 5735

- CARCINOGEN, CHEMICAL
  - ANIMALS, LABORATORY
    - DATA EXTRAPOLATION, REVIEW, 5482*
  - CARCINOMA, BRONCHOGENIC
    - CELL TRANSFORMATION, NEOPLASTIC, REVIEW, 5406
    - IMMUNE RESPONSE, REVIEW, 5406
  - CELL TRANSFORMATION, NEOPLASTIC
    - EPIDERMIS, MOUSE, REVIEW, 5484*
  - CHROMOSOME ABERRATIONS
    - CELL TRANSFORMATION, NEOPLASTIC, REVIEW, 5453
    - MUTAGENIC ACTIVITY, REVIEW, 5401
  - DIET
    - COCARCINOGENESIS, REVIEW, 5490*
  - DNA
    - MUTAGENIC ACTIVITY, REVIEW, 5401
  - DNA REPAIR
    - BIOASSAY, 5931*
    - CARCINOGEN PRESCREENING, 5617*
    - EPIDERMIS, MOUSE, REVIEW, 5484*
    - FIBROBLASTS, 5617*
    - SEDIMENTATION ANALYSIS, 5931*
  - ENVIRONMENTAL HAZARD
    - RISK EVALUATION, REVIEW, 5492*
  - ENVIRONMENTAL POLLUTANTS
    - RISK EVALUATION, REVIEW, 5500*
  - ENZYMATIC ACTIVITY
    - COCARCINOGENESIS, REVIEW, 5490*
  - LIVER NEOPLASMS
    - PRECANCEROUS CONDITIONS, REVIEW, 5403
  - MUTATION
    - ASSAY SYSTEM, REVIEW, 5401
  - NEOPLASMS
    - NOMENCLATURE SYSTEM, 5477
    - REVIEW, 5402
  - NEUROSPORA CRASSA
    - MUTAGENIC ACTIVITY ASSAY, REVIEW, 5479*
  - NOMENCLATURE SYSTEM
    - CARCINOGENIC PROCESSES, 5477
  - ONCOGENIC VIRUSES
    - COCARCINOGENESIS, REVIEW, 5490*
  - SACCHAROMYCES CEREVISIAE
    - MUTAGENIC ACTIVITY ASSAY, REVIEW, 5479*
  - SALMONELLA
    - MUTAGENIC ACTIVITY ASSAY, REVIEW, 5479*
  - SKIN NEOPLASMS
    - MOUSE, REVIEW, 5484*
  - TRANSFORMATION, GENETIC
    - MUTAGENIC ACTIVITY, REVIEW, 5401
  - XERODERMA PIGMENTOSUM
    - DNA REPAIR, REVIEW, 5498*

- CARCINOGEN, ENVIRONMENTAL
  - NEOPLASMS
    - EPIDEMIOLOGY, REVIEW, 5542*

- CARCINOID TUMOR
  - DUODENAL ULCER
    - CASE REPORT, 5863*
  - HYPERTHYROIDISM
    - CASE REPORT, 5863*
  - INTESTINAL NEOPLASMS
    - DUODENAL ULCER, 5863*
    - REVIEW, 5458
  - MEDIASTINAL NEOPLASMS
    - CASE REPORT, 5786
    - ROSETTE FORMATION, 5786
  - TESTICULAR NEOPLASMS
    - EPIDEMIOLOGY, 5779
    - HISTOLOGICAL STUDY, 5779
  - THYMUS NEOPLASMS
    - CALCITONIN, 5906

- CARCINOMA

- BLADDER NEOPLASMS
  - BRACKEN FERN, 5549
  - EPIDEMIOLOGY, CATTLE, 5549
- BREAST NEOPLASMS
  - ADENOSINE CYCLIC 3',5' MONOPHOSPHATE, 5820*
  - ADENYL CYCLASE, 5820*
  - ENZYMATIC ACTIVITY, 5820*
  - PHOSPHODIESTERASES, 5820*
  - PROTEIN KINASE, 5820*
- CERVIX NEOPLASMS
  - EPIDEMIOLOGY, CZECHOSLOVAKIA, 5867
- CHROMATIN
  - RNA, 5998*
- IMMUNITY, CELLULAR
  - LYMPHOCYTE TRANSFORMATION, 5736
- INTESTINAL NEOPLASMS
  - FIBRINOLYSIS, 5800
- LUNG NEOPLASMS
  - ASBESTOSIS, 5802
- NUCLEOPROTEINS
  - RNA, 5998*
- OVARIAN NEOPLASMS
  - EPIDEMIOLOGY, CZECHOSLOVAKIA, 5867
- PRECANCEROUS CONDITIONS
  - CELLS, CULTURED, 5808*
- PROSTATIC NEOPLASMS
  - CLASSIFICATION, 5777
  - NEOPLASM METASTASIS, 5777
  - NEOPLASM TRANSPLANTATION, 5963*
- THYROID NEOPLASMS
  - NEOPLASM RECURRENCE, LOCAL, 5784
  - ULTRASTRUCTURAL STUDY, 5845*
- UTERINE NEOPLASMS
  - EPIDEMIOLOGY, CZECHOSLOVAKIA, 5867
- VIRUS-LIKE PARTICLES
  - MAMMARY NEOPLASMS, EXPERIMENTAL, 5707*

CARCINOMA, BASAL CELL
- COLLAGEN
  - ULTRASTRUCTURAL STUDY, 5836*
- CYSTS
  - CASE REPORT, 5788
- DESMOSOMES
  - ULTRASTRUCTURAL STUDY, 5836*
- DOGS
  - INCIDENCE RATES, 5888*
- EAR NEOPLASMS
  - EPIDEMIOLOGY, USSR, 5876
- PSEUDOPODIA
  - ULTRASTRUCTURAL STUDY, 5836*
- SKIN NEOPLASMS
  - CASE REPORT, 5788
  - ULTRASTRUCTURAL STUDY, 5836*

CARCINOMA, BRONCHIOLAR
- LUNG NEOPLASMS
  - EPIDEMIOLOGY, REVIEW, 5480*
  - PLUTONIUM, 5627*
- ONCOGENIC VIRUSES
  - CELL TRANSFORMATION, NEOPLASTIC, REVIEW, 5406
- RADIATION, IONIZING
  - CELL TRANSFORMATION, NEOPLASTIC, REVIEW, 5406
- TWINS
  - CASE REPORT, 5853*
  - NEOPLASM METASTASIS, 5853*

CARCINOMA, BRONCHOGENIC
- CARCINOGEN, CHEMICAL
  - CELL TRANSFORMATION, NEOPLASTIC, REVIEW, 5406
  - IMMUNE RESPONSE, REVIEW, 5406
- RETINOL
  - SERUM LEVELS, 5532*

CARCINOMA, DUCTAL
- BREAST NEOPLASMS
  - EPIDEMIOLOGY, MALE, REIVEW, 5460
  - ISOANTIGENS, 5449
  - LEUKEMIA, MYELOCYTIC, 5814*
  - RADIATION, IONIZING, 5499*

CARCINOMA, EHRLICH TUMOR
- ANEMIA
  - EXTRAMEDULLARY TUMOR, 5850*
- FORMAMIDE, N,N-DIMETHYL-
  - RIBONUCLEOTIDE REDUCTASES, 5916
- GLYCOGENOSIS
  - ULTRASTRUCTURAL STUDY, 5942*
- GROWTH
  - CELL CYCLE KINETICS, 5899*, 5900*
  - DAMPING FUNCTION, 5900*
  - GLYCOGEN-NEGATIVE SUBLINE, 5899*
  - MATHEMATICAL MODEL, 5900*
  - PLOIDIES, 5900*
- HEMATOPOIESIS
  - EXTRAMEDULLARY TUMOR, 5850*
- METHANE, SULFINYLBIS-
  - RIBONUCLEOTIDE REDUCTASES, 5916
- MITOSIS
  - CELL CYCLE KINETICS, 5899*
- PLOIDIES
  - CELL DIFFERENTIATION, 5900*
- PROTEIN KINASE
  - ISOLATION AND CHARACTERIZATION, 5995*

CARCINOMA, EMBRYONAL
- SEE TERATOID TUMOR

CARCINOMA, EPIDERMOID
- BRONCHIAL NEOPLASMS
  - EPIDEMIOLOGY, AUSTRIA, 5873
- CHALONES
  - CELL DIVISION, 5943*
- EAR NEOPLASMS
  - EPIDEMIOLOGY, USSR, 5876
- HEAD AND NECK NEOPLASMS
  - NUCLEOTIDES, CYCLIC, 5758*
- LUNG NEOPLASMS
  - EPIDEMIOLOGY, REVIEW, 5480*
- RESPIRATORY TRACT NEOPLASMS
  - CASE REPORT, 5801
  - CHALONES, 5943*

CARCINOMA IN SITU
- BLADDER NEOPLASMS
  - IMMUNE RESPONSE, REVIEW, 5773*
- BREAST NEOPLASMS
  - ISOANTIGENS, 5449
- CERVIX NEOPLASMS
  - CONTRACEPTIVES, ORAL, 5868

CARCINOMA, MUCINOUS
- STOMACH NEOPLASMS
  - UREA, 3-ACETYL-1-METHYL-1-NITROSO

* INDICATES A PLAIN CITATION WITHOUT ACCOMPANYING ABSTRACT

5587

RCINOMA, OAT CELL
- LUNG NEOPLASMS
  - EPIDEMIOLOGY, REVIEW, 5480*

RCINOMA, PAPILLARY
- THYROID NEOPLASMS
  - ADENYL CYCLASE, 5915
  - HYPERPARATHYROIDISM, 5844*
  - PHOSPHOTRANSFERASES, 5915
  - ULTRASTRUCTURAL STUDY, 5845*

RCINOMA, RENAL CELL
- SEE ADENOCARCINOMA

RCINOMA, SQUAMOUS CELL
- SEE CARCINOMA, EPIDERMOID

RCINOMA, TRANSITIONAL CELL
- BLADDER NEOPLASMS
  - CELL DIFFERENTIATION, 5798
  - CHROMATIN, 5798
  - DNA, 5798
  - NUCLEIC ACIDS, 5937*
  - PYRIMIDINES, 5937*
- GONADOTROPINS, CHORIONIC
  - IMMUNITY, CELLULAR, 5732
- NUCLEIC ACIDS
  - CELL CYCLE KINETICS, 5937*
- PYRIMIDINES
  - CELL CYCLE KINETICS, 5937*

RCINOMA 256, WALKER
- BUTYRIC ACID, 2-AMINO-4-MERCAPTO-
  - METHIONINE, 5936*
  - METHYLTRANSFERASES, 5936*

TALASE
- HEPATOMA
  - OXIDOREDUCTASES, 5971*
- LIVER NEOPLASMS
  - BENZENAMINE, N,N-DIMETHYL-4-((3-METHYLPHENYL)AZO)-, 5547

TECHOLAMINES
- HEPATOMA
  - ADENYL CYCLASE, 5957*
  - RECEPTORS, DRUG, 5957*
- NEUROBLASTOMA
  - AZAQUANINE-RESISTANT MUTANTS, 5796
  - THIOGUANINE-RESISTANT MUTANTS, 5796
- PITUITARY NEOPLASMS
  - PROLACTIN, 5955*

CAL NEOPLASMS
- ADENOCARCINOMA
  - ANEMIA, HEMOLYTIC, AUTOIMMUNE, 5810*
  - ANTIBODY FORMATION, 5810*
  - AUTOANTIBODIES, 5810*
- ANEMIA, HEMOLYTIC, AUTOIMMUNE
  - CASE REPORT, 5810*
- AUTOANTIBODIES
  - IGG, 5810*

L ADHESION
- LEUKEMIA
  - CELL MIXTURES, 5966*
  - RETICULOCYTES, 5966*
- NEOPLASM METASTASIS
  - CELL MEMBRANE, REVIEW, 5523*
- VIRUS, SV40
  - CELL TRANSFORMATION, NEOPLASTIC, 5715*
  - TEMPERATURE SENSITIVE MUTANTS, 5715*

CELL AGGREGATION
- BREAST NEOPLASMS
  - CELL MEMBRANE, 5821*
  - ULTRASTRUCTURAL STUDY, 5821*
- NEOPLASM METASTASIS
  - CELL CULTURE MODEL, REVIEW, 5932*

CELL DIFFERENTIATION
- ADENOSINE CYCLIC 3',5' MONOPHOSPHATE
  - EPITHELIAL CELLS, 5946*, 5974*
- BLADDER NEOPLASMS
  - CARCINOMA, TRANSITIONAL CELL, 5798
- CARCINOMA, EHRLICH TUMOR
  - PLOIDIES, 5900*
- CELL MEMBRANE
  - ANTIGENS, 5507*
  - IGE, 5507*
  - LYMPHOCYTES, 5507*
  - PROSTAGLANDINS E, 5507*
- DNA
  - EPITHELIAL CELLS, 5974*
- EPITHELIAL CELLS
  - ULTRASTRUCTURAL STUDY, 5974*
- ERYTHREMIC MYELOSIS
  - CASE REPORT, 5827*
- GUANOSINE CYCLIC 3',5' MONOPHOSPHATE
  - EPITHELIAL CELLS, 5946*, 5974*
- HEMATOPOIETIC STEM CELLS
  - CELLS, CULTURED, REVIEW, 5934*
- HODGKIN'S DISEASE
  - ULTRASTRUCTURAL STUDY, 5726, 5859*
- INTESTINAL NEOPLASMS
  - TRANSPLANTATION, HETEROLOGOUS, 5970*
- LEUKEMIA
  - BONE MARROW CELLS, 5902
  - CELL MEMBRANE, REVIEW, 5523*
  - CHILD, 5902
- MAMMAE
  - GONADECTOMY, MOUSE, 5781
- MELANOMA
  - DIBUTYRYL CYCLIC AMP, 5834*
  - ULTRASTRUCTURAL STUDY, 5834*
- NEOPLASMS
  - CELLS, CULTURED, REVIEW, 5934*
- NERVOUS SYSTEM NEOPLASMS
  - CELL TRANSFORMATION, NEOPLASTIC, REVIEW, 5531*
- NEUROBLASTOMA
  - ADENOSINE CYCLIC 3',5' MONOPHOSPHATE, 5965*
  - NERVE GROWTH FACTOR, 5965*
  - PLANT AGGLUTININS, 5965*
- ORBITAL NEOPLASMS
  - HEMANGIOENDOTHELIOMA, 5795
  - HEMANGIOPERICYTOMA, 5795
- PITUITARY GLAND
  - GONADECTOMY, MOUSE, 5781
- SARCOMA

    - CELL MEMBRANE, REVIEW, 5523*
  - SKELETON
    - ABNORMALITIES, REVIEW, 5531*
  - SWEAT GLAND NEOPLASMS
    - HISTOLOGICAL STUDY, 5840*
  - VIRUS, FRIEND MURINE LEUKEMIA
    - CELL CYCLE KINETICS, SPLEEN, 5651

- CELL DIVISION
  - BENZO(A)PYRENE
    - LIVER, MOUSE, 5599*
  - CARCINOMA, EPIDERMOID
    - CHALONES, 5943*
  - CELL MEMBRANE
    - CELL TRANSFORMATION, NEOPLASTIC, REVIEW, 5442, 5443
  - CELL TRANSFORMATION, NEOPLASTIC
    - CELL CULTURE MODEL, REVIEW, 5932*
  - LEUKEMIA
    - UREA, HYDROXY-, 5903
  - LIPIDS
    - AUTOOXIDATION, REVIEW, 5476
  - MYXOMYCETES
    - ANTIBODIES, 5904
    - PLASMODIUM, 5904
  - PROLACTIN
    - BREAST, 5560

- CELL FUSION
  - L CELLS
    - CARCINOGENIC POTENTIAL, MOUSE, 5964*
    - KARYOTYPING, 5964*
  - NEOPLASM METASTASIS
    - EMBOLISM, 5540*
  - VIRUS, SENDAI
    - RNA, TRANSFER, 5698
  - XERODERMA PIGMENTOSUM
    - DNA REPAIR, REVIEW, 5498*

- CELL MEMBRANE
  - ADENOCARCINOMA
    - C-TYPE PARTICLES, 5710*
  - ADENOSINE CYCLIC 3',5' MONOPHOSPHATE
    - REVIEW, 5474
  - ANTIGENS
    - CELL TRANSFORMATION, NEOPLASTIC, REVIEW, 5442
  - BREAST NEOPLASMS
    - CELL AGGREGATION, 5821*
  - CELL CYCLE KINETICS
    - REVIEW, 5474
  - CELL DIFFERENTIATION
    - ANTIGENS, 5507*
    - IGE, 5507*
    - LYMPHOCYTES, 5507*
    - PROSTAGLANDINS E, 5507*
  - CELL DIVISION
    - CELL TRANSFORMATION, NEOPLASTIC, REVIEW, 5442, 5443
  - CELL TRANSFORMATION, NEOPLASTIC
    - IMMUNE RESPONSE, 5509*
  - CELLULAR INCLUSIONS
    - CELL TRANSFORMATION, NEOPLASTIC, REVIEW, 5960*
  - CHROMOSOME ABERRATIONS
    - CELL TRANSFORMATION, NEOPLASTIC, REVIEW, 5443
  - CONCANAVALIN A
    - CARBOHYDRATES, 5909
    - IMMUNE SERUMS, 5909
    - PEROXIDASES, 5909
    - ULTRASTRUCTURAL STUDY, 5909
  - CONTACT INHIBITION
    - CELL TRANSFORMATION, NEOPLASTIC, REVIEW, 5443
  - ENZYMES
    - CELL TRANSFORMATION, NEOPLASTIC, REVIEW, 5960*
  - GROWTH
    - CELLS, CULTURED, 5470
    - HELA CELLS, 5470
  - GUANOSINE CYCLIC 3',5' MONOPHOSPHATE
    - REVIEW, 5474
  - ISOBUTYRIC ACID, ALPHA-AMINO-
    - CELL TRANSFORMATION, NEOPLASTIC, 5674
  - LEUKEMIA
    - ANTIGEN-ANTIBODY COMPLEX, 5765*
    - ANTIGENS, 5760*
  - LEUKEMIA, LYMPHOBLASTIC
    - GLYCOPROTEINS, 5947*
  - LIPIDS
    - AUTOOXIDATION, REVIEW, 5476
  - LIVER NEOPLASMS
    - ALKALINE PHOSPHATASE, 5993*
  - B-LYMPHOCYTES
    - COMPLEMENT, 5767*
    - IMMUNOGLOBULINS, FC, 5767*
  - LYMPHOMA
    - CHOLESTEROL, 5961*
  - MELANOMA
    - CELL CYCLE KINETICS, 5790
    - IMMUNITY, CELLULAR, 5744
    - TRANSFERASES, 5996*
    - ULTRASTRUCTURAL STUDY, 5790
  - MICROSOMES, LIVER
    - ISOLATION AND CHARACTERIZATION, 5908
  - NEOPLASM METASTASIS
    - IMMUNE RESPONSE, 5509*
  - ONCOGENIC VIRUSES
    - CELL TRANSFORMATION, NEOPLASTIC, REVIEW, 5443
  - PEPTIDES
    - ISOLATION AND CHARACTERIZATION, 5908
    - MICROSOMES, LIVER, 5908
  - PHOSPHOLIPIDS
    - ISOLATION AND CHARACTERIZATION, 5908
    - MICROSOMES, LIVER, 5908
  - PROTEINS
    - CELL TRANSFORMATION, NEOPLASTIC, REVIEW, 5960*
  - THYMOMA
    - NUCLEOTIDASES, 5979*
    - PHOSPHODIESTERASES, 5979*
  - VIRUS, SV40
    - CELL TRANSFORMATION, NEOPLASTIC, 5715*
    - TEMPERATURE SENSITIVE MUTANTS, 5715*

- CELL MIGRATION INHIBITION
  - BRAIN NEOPLASMS
    - ANTIGENS, NEOPLASM, 5733

- L SURVIVAL
  - BENZO(A)PYRENE
    - LIVER, MOUSE, 5599*
  - RADIATION, IONIZING
    - FIBROBLASTS, CHICKEN, 5632*
    - FIBROBLASTS, MOUSE, 5632*
- L TRANSFORMATION, NEOPLASTIC
  - ACETOHYDROXAMIC ACID, N-FLUOREN-2-YL-
    - FREE RADICALS, 5410
  - ALKALINE PHOSPHATASE
    - ISOLATION AND CHARACTERIZATION, 5988*
  - ANEMIA, APLASTIC
    - GENETICS, 5806
  - ANEUPLOIDY
    - REVIEW, 5457
  - ANTIGEN-ANTIBODY REACTIONS
    - IMMUNE RESPONSE, REVIEW, 5444
  - ANTIGENS, NEOPLASM
    - IMMUNE RESPONSE, REVIEW, 5445
  - ATAXIA TELANGIECTASIA
    - EPIDEMIOLOGY, REVIEW, 5455
    - GENETICS, 5806
  - BENZ(A)ANTHRACENE, 7,12-DIMETHYL-
    - ARYL HYDROCARBON HYDROXYLASES, 5569
    - FREE RADICALS, 5410
    - GANGLIOSIDES, 5603*
    - ULTRASTRUCTURAL STUDY, MOUSE EMBRYO, 5603*
  - BENZO(A)PYREN-6-OL
    - FREE RADICALS, 5410
  - BENZO(A)PYRENE
    - ANTIGEN-ANTIBODY REACTIONS, 5618*
    - ARYL HYDROCARBON HYDROXYLASES, 5569
    - IMMUNE SERUMS, 5618*
    - MUTAGENIC ACTIVITY, HAMSTER EMBRYO, 5619*
    - VIRAL VACCINES, 5566
  - BENZO(B)TRIPHENYLENE
    - ARYL HYDROCARBON HYDROXYLASES, 5569
  - CALCIUM
    - PHOSPHODIESTERASES, 5987*
  - CARBAMIC ACID, ETHYL ESTER
    - DOSE-RESPONSE STUDY, REVIEW, 5483*
  - CARCINOGEN, CHEMICAL
    - EPIDERMIS, MOUSE, REVIEW, 5484*
  - CELL DIVISION
    - CELL CULTURE MODEL, REVIEW, 5932*
  - CELL MEMBRANE
    - ANTIGENS, 5442
    - CELL DIVISION, 5442
    - IMMUNE RESPONSE, 5509*
    - ISOBUTYRIC ACID, ALPHA-AMINO-, 5674
  - CHOLANTHRENE, 3-METHYL-
    - ANTIGEN-ANTIBODY REACTIONS, 5618*
    - ARYL HYDROCARBON HYDROXYLASES, 5569
    - GANGLIOSIDES, 5603*
    - IMMUNE SERUMS, 5618*
    - RECEPTORS, HORMONE, 5926
    - ULTRASTRUCTURAL STUDY, MOUSE EMBRYO, 5603*
    - VIRAL VACCINES, 5566
  - CHROMOSOMES
    - REVIEW, 5457
  - COLON
    - NUCLEOPROTEINS, 5990*
  - COLONIC NEOPLASMS
    - AGE FACTORS, 5856*
    - GENES, RECESSIVE, 5856*
  - CYSTS
    - CELLS, CULTURED, 5808*
  - CYTOSINE, 1-BETA-D-ARABINOFURANOSYL-
    - ANTIGEN-ANTIBODY REACTIONS, 5618*
    - IMMUNE SERUMS, 5618*
  - DIBENZ(A,H)ANTHRACENE
    - ARYL HYDROCARBON HYDROXYLASES, 5569
  - DIETHYLAMINE, N-NITROSO-
    - DOSE-RESPONSE STUDY, REVIEW, 5483*
  - DIMETHYLAMINE, N-NITROSO-
    - CELLS, CULTURED, 5609*
    - KIDNEY, RAT, 5609*
  - ENDOPLASMIC RETICULUM
    - ISOBUTYRIC ACID, ALPHA-AMINO-, 5674
  - EPITHELIUM
    - CELLS, CULTURED, 5808*
  - FIBROBLASTS
    - INSULIN, 5926
  - GENETICS
    - IMMUNE RESPONSE, REVIEW, 5444
    - REVIEW, 5457
  - GUANIDINE, 1-METHYL-3-NITRO-1-NITROSO-
    - MUTAGENIC ACTIVITY, HAMSTER EMBRYO, 5619*
  - HAPLOIDY
    - REVIEW, 5457
  - HISTOCOMPATIBILITY ANTIGENS
    - ANTIGENIC DETERMINANTS, REVIEW, 5448
  - LEUKEMIA L1210
    - ACTINOMYCIN D-RESISTANCE, 5712*
  - LUNG NEOPLASMS
    - FIBROBLASTS, 5905
  - LYMPHOCYTES
    - IMMUNE RESPONSE, REVIEW, 5444
  - LYMPHOMA
    - BLOOD COAGULATION, 5676
    - HEMOSTASIS, 5676
  - MAGNESIUM
    - PHOSPHODIESTERASES, 5987*
  - MANGANESE
    - PHOSPHODIESTERASES, 5987*
  - MYCOSIS FUNGOIDES
    - SEZARY CELLS, 5832*
  - NERVOUS SYSTEM NEOPLASMS
    - ULTRASTRUCTURAL STUDY, MOUSE, RAT, 5860*
    - UREA, ETHYL NITROSO-, 5860*
  - NITROSO COMPOUNDS
    - NUCLEIC ACIDS, 5411
  - PHOSPHODIESTERASES
    - EMBRYO, MOUSE, 5987*
  - POLYCYCLIC HYDROCARBONS
    - EMBRYO, MOUSE, 5614*
    - FREE RADICALS, 5410
    - URIDINE, 2'-DEOXY-5-IODO-, 5614*
    - VIRUS, MURINE LEUKEMIA, 5614*
  - PROSTAGLANDINS E
    - GALACTOSE, 5939*
  - QUINOLINE, 4-NITRO-, 1-OXIDE
    - REVIEW, 5425

    RADIATION, IONIZING
        RECEPTORS, HORMONE, 5926
    RECEPTORS, HORMONE
        INSULIN, 5926
    RNA, TRANSFER, METHYLTRANSFERASES
        REVIEW, 5978*
    SCREENING, CARCINOGENIC CHEMICALS
        REVIEW, 5425
    SODIUM CHLORIDE
        ISOBUTYRIC ACID, ALPHA-AMINO-, 5674
    4-STILBENAMINE, N,N-DIMETHYL-
        DOSE-RESPONSE STUDY, REVIEW, 5483*
    THEOPHYLLINE
        PHOSPHODIESTERASES, 5987*
    ULTRAVIOLET RAYS
        DNA, 5629*
        EMBRYO, HAMSTER, 5629*
        URIDINE, 5-BROMO-2'-DEOXY-, 5629*
    URIDINE
        GALACTOSE, 5939*
    URIDINE, 5-BROMO-2'-DEOXY-
        EMBRYO, HAMSTER, 5629*
    VIRUS, ADENO 5
        DNA, VIRAL, 5686
        RNA, VIRAL, 5686
    VIRUS, AVIAN LEUKEMIA
        REVIEW, 5506*
    VIRUS, AVIAN LEUKOSIS
        HISTOPATHOLOGICAL STUDY, REVIEW, 5511*
    VIRUS, AVIAN LEUKOSIS-SARCOMA
        REVIEW, 5506*
    VIRUS, AVIAN SARCOMA
        GENOME, 5643
        TEMPERATURE SENSITIVE MUTANTS, REVIEW, 5508*
    VIRUS, C-TYPE RNA TUMOR
        EMBRYO, MOUSE, 5614*
    VIRUS, CYTOMEGALO
        ANTIGEN-ANTIBODY REACTIONS, 5692
        IMMUNE RESPONSE, 5692
        RADIATION, IONIZING, 5692
    VIRUS, DNA TUMOR
        EPIDEMIOLOGY, REVIEW, 5432
        REVIEW, 5519*
    VIRUS, EPSTEIN-BARR
        REVIEW, 5440
    VIRUS, FRIEND MURINE LEUKEMIA
        ANTIGEN-ANTIBODY REACTIONS, 5653
    VIRUS, HERPES SIMPLEX
        ANTIGEN-ANTIBODY REACTIONS, 5692
        IMMUNE RESPONSE, 5692
        RADIATION, IONIZING, 5692
    VIRUS, HERPES SIMPLEX 2
        ANTIGENS, VIRAL, 5691
        REVIEW, 5440
    VIRUS, MOLONEY MURINE LEUKEMIA
        CHOLANTHRENE, 3-METHYL-, 5749
    VIRUS, MURINE LEUKEMIA
        ANTIGENIC DETERMINANTS, REVIEW, 5513*
    VIRUS, MURINE MAMMARY TUMOR
        STRAIN DIFFERENCE, REVIEW, 5514*
    VIRUS, MURINE SARCOMA
        ANTIGENIC DETERMINANTS, REVIEW, 5513*
        GLUCOSEPHOSPHATE DEHYDROGENASE, 5662
        HEXOKINASE, 5662
        PHOSPHOFRUCTOKINASE, 5662
        PHOSPHOGLUCONATE DEHYDROGENASE, 5662
        RECEPTORS, HORMONE, 5926
    VIRUS, POLYOMA
        GALACTOSE, 5939*
        HISTOLOGICAL STUDY, REVIEW, 5517*
    VIRUS, RNA TUMOR
        EPIDEMIOLOGY, REVIEW, 5432
        REVIEW, 5520*
    VIRUS, ROUS SARCOMA
        DNA, VIRAL, 5646
        GALACTOSE, 5645
        GLUCOSE, 2-DEOXY-, 5645
        LEUCINE, 5645
        MICROTUBULES, 5775*
        PHOSPHODIESTERASES, 5644
        PROTEINS, 5644
        REVIEW, 5506*
        THYMIDINE, 5645
        URIDINE, 5645
    VIRUS, SV40
        ANTIGENS, VIRAL, 5667
        CAFFEINE, 5668
        CELL ADHESION, 5715*
        CELL CYCLE KINETICS, 5668
        CELL MEMBRANE, 5715*
        CHROMOSOMES, 5672
        CLONE CELLS, 5714*
        DNA, 5672
        DOSE-RESPONSE STUDY, 5668
        FIBROBLASTS, 5672
        FIBROBLASTS, MOUSE, 5673
        IMMUNOSUPPRESSION, 5671
        ISOBUTYRIC ACID, ALPHA-AMINO-, 5673, 5674
        METHIONINE, 5936*
        MOUSE, NUDE, 5714*
        RADIATION, IONIZING, 5668
        RECEPTORS, HORMONE, 5926
        TISSUE CULTURE, 5671
    XERODERMA PIGMENTOSUM
        DNA REPAIR, REVIEW, 5498*

CELLS, CULTURED
    BLADDER NEOPLASMS
        BLOCKING FACTORS, 5729
    CARCINOMA
        PRECANCEROUS CONDITIONS, 5808*
    CELL MEMBRANE
        GROWTH, 5470
    CELL TRANSFORMATION, NEOPLASTIC
        EPITHELIUM, 5808*
    CYSTS
        CELL TRANSFORMATION, NEOPLASTIC, 5808*
    CYTOCHROME OXIDASE
        MAMMAE, 5972*
    DIMETHYLAMINE, N-NITROSO-
        CELL TRANSFORMATION, NEOPLASTIC, 5609*
    HELA CELLS
        ENZYMATIC ACTIVITY, 5962*
        VIRUS, SENDAI, 5962*
    HEPATOMA
        CARCINOGENIC POTENTIAL, 5467
        CONTACT INHIBITION, 5467
        ISOLATION AND CHARACTERIZATION,

    - REVIEW, 5467
    - KARYOTYPING, 5467
    - OXIDOREDUCTASES, 5971*
    - SURFACE PROPERTIES, 5467
  - KARYOTYPING
    - G-BANDING, 5962*
  - LIVER
    - CARBOXY-LYASES, 5468
    - LEUCINE INCORPORATION, 5468
    - ULTRASTRUCTURAL STUDY, 5468
  - LIVER NEOPLASMS
    - ALKALINE PHOSPHATASE, 5993*
  - MALATE DEHYDROGENASE
    - MAMMAE, 5972*
  - MAMMARY NEOPLASMS, EXPERIMENTAL
    - BLOCKING FACTORS, 5729
  - MELANOMA
    - KARYOTYPING, 5834*
  - MICROTUBULES
    - IMMUNOFLUORESCENCE, 5775*
  - ONCOGENIC VIRUSES
    - CELL TRANSFORMATION, NEOPLASTIC, REVIEW, 5434
  - OXIDOREDUCTASES
    - MAMMAE, 5972*
  - PHOSPHOTRANSFERASES, ATP
    - MAMMAE, 5972*
  - PROTEINS
    - MAMMAE, 5972*
  - SARCOMA
    - IMMUNOGLOBULINS, 5746
  - SUCCINATE DEHYDROGENASE
    - MAMMAE, 5972*

- ELLULAR INCLUSIONS
  - CELL MEMBRANE
    - CELL TRANSFORMATION, NEOPLASTIC, REVIEW, 5960*
  - PITUITARY NEOPLASMS
    - ACROMEGALY, 5783
    - ADENOMA, 5783
    - ADENOMA, CHROMOPHOBE, 5783

- ELLULOSE, METHYL ETHER
  - MELANOMA
    - CHROMOSOME ABNORMALITIES, 5833*

- NTRAL NERVOUS SYSTEM
  - ANTINEOPLASTIC AGENTS
    - SIDE EFFECTS, REVIEW, 5408

- EREBELLAR NEOPLASMS
  - ASTROCYTOMA
    - DIAGNOSIS, DIFFERENTIAL, 5530*
    - HISTOLOGICAL STUDY, REVIEW, 5530*

- RVIX NEOPLASMS
  - ADENOCARCINOMA
    - 4,4'-STILBENEDIOL, ALPHA,ALPHA'-DIETHYL-, 5415
  - CARCINOMA
    - EPIDEMIOLOGY, CZECHOSLOVAKIA, 5867
  - CARCINOMA IN SITU
    - CONTRACEPTIVES, ORAL, 5868
  - CONTRACEPTIVES, ORAL
    - PRECANCEROUS CONDITIONS, 5868
  - GLYCOGEN
    - PRECANCEROUS CONDITIONS, 5799
  - GLYCOGEN PHOSPHORYLASE
    - PRECANCEROUS CONDITIONS, 5799
  - GLYCOGEN SYNTHETASE
    - PRECANCEROUS CONDITIONS, 5799
  - IMMUNITY, CELLULAR
    - RADIATION EFFECTS, 5769*
  - IMMUNOGLOBULINS
    - RADIATION EFFECTS, 5769*
  - IMMUNOSUPPRESSION
    - EPIDEMIOLOGY, REVIEW, 5881
    - RADIATION EFFECTS, 5769*
  - LIPIDS
    - ISOLATION AND CHARACTERIZATION, 5940*
  - NEOPLASMS, MULTIPLE PRIMARY
    - EPIDEMIOLOGY, 5865
  - PHOSPHOLIPIDS
    - ISOLATION AND CHARACTERIZATION, 5940*
  - PRECANCEROUS CONDITIONS
    - REVIEW, 5436
  - 4,4'-STILBENEDIOL, ALPHA,ALPHA'-DIETHYL-
    - REVIEW, 5436
  - SUBCELLULAR FRACTIONS
    - LIPIDS, 5940*
    - PHOSPHOLIPIDS, 5940*
  - VIRUS, HERPES SIMPLEX 2
    - ANTIGEN-ANTIBODY REACTIONS, REVIEW, 5515*, 5516*, 5894*
    - CARCINOGENIC POTENTIAL, REVIEW, 5432, 5433, 5438
    - EPIDEMIOLOGY, REVIEW, 5515*, 5894*
    - REVIEW, 5436
    - SEROEPIDEMIOLOGIC STUDY, REVIEW, 5516*
    - ULTRASTRUCTURAL STUDY, REVIEW, 5515*

- CHALONES
  - CARCINOMA, EPIDERMOID
    - CELL DIVISION, 5943*
  - DNA REPLICATION
    - CELL CYCLE KINETICS, 5944*
  - EPIDERMIS
    - CELL CYCLE KINETICS, 5944*
  - INTESTINES
    - DNA REPLICATION, 5968*
    - ISOLATION, RABBIT, 5968*
  - MITOSIS
    - CELL CYCLE KINETICS, 5944*
  - RESPIRATORY TRACT NEOPLASMS
    - CARCINOMA, EPIDERMOID, 5943*

- CHLORAMPHENICOL
  - DEXAMETHASONE
    - MITOCHONDRIA, LIVER, 5925

- CHLOROFORM
  - NEOPLASMS
    - WATER POLLUTANTS, CHEMICAL, 5897*

- CHOLANGIOMA
  - ACETAMIDE, N-FLUOREN-2-YLDI-
    - AGE FACTORS, RAT, 5596*
    - SEX FACTORS, RAT, 5596*

- CHOLANTHRENE, 3-METHYL-
  - ACTIN
    - IMMUNE SERUMS, 5618*

  ANTIGEN-ANTIBODY REACTIONS
    CELL TRANSFORMATION, NEOPLASTIC, 5618*
  ARYL HYDROCARBON HYDROXYLASES
    EPIDERMIS, MOUSE, 5569
    EPITHELIAL CELLS, 5548
  BLOOD CIRCULATION
    LIVER, RAT, 5572
  CELL TRANSFORMATION, NEOPLASTIC
    ARYL HYDROCARBON HYDROXYLASES, 5569
    ULTRASTRUCTURAL STUDY, MOUSE EMBRYO, 5603*
  CHROMATIN
    BINDING, MOUSE EMBRYO, 5602*
    DOSE-RESPONSE STUDY, 5602*
  DIMETHYLAMINE, N-NITROSO-
    OXIDOREDUCTASES, N-DEMETHYLATING, 5573
  GANGLIOSIDES
    CELL TRANSFORMATION, NEOPLASTIC, 5603*
  GLIOMA
    C-TYPE PARTICLES, 5797
    DNA, 5797
  HEPATOMA
    TRANSFERASES, 5565
  HYDROXYLASES
    GENETICS, MOUSE, 5571
  IMMUNE SERUMS
    CELL TRANSFORMATION, NEOPLASTIC, 5618*
  LARYNGEAL NEOPLASMS
    ARYL HYDROCARBON HYDROXYLASES, 5600*
  MAMMARY NEOPLASMS, EXPERIMENTAL
    ADENOCARCINOMA, 5741
    TRANSPLANTATION IMMUNOLOGY, 5741
  RADIATION, IONIZING
    ARYL HYDROCARBON HYDROXYLASES, 5640*
  RECEPTORS, HORMONE
    CELL TRANSFORMATION, NEOPLASTIC, 5926
  SARCOMA
    IMMUNITY, CELLULAR, 5735
    TRANSPLANTATION IMMUNOLOGY, 5741, 5746
  VIRAL VACCINES
    CELL TRANSFORMATION, NEOPLASTIC, 5566
    VIRUS, FRIEND MURINE LEUKEMIA, 5566
    VIRUS, ROUS SARCOMA, 5566
  VIRUS, FRIEND MURINE LEUKEMIA
    VIRAL VACCINES, 5566
  VIRUS, MOLONEY MURINE LEUKEMIA
    CELL TRANSFORMATION, NEOPLASTIC, 5749
  VIRUS, ROUS SARCOMA
    VIRAL VACCINES, 5566

CHOLESTEROL
  LYMPHOMA
    CELL MEMBRANE, 5961*
    GLUCOSE, 5961*

CHORIOCARCINOMA
  FETAL GLOBULINS
    ANTIGENIC DETERMINANTS, REVIEW, 5448
  THYROTROPIN
    ISOLATION AND CHARACTERIZATION, REVIEW, 5451

CHROMATIN
  BLADDER NEOPLASMS
    CARCINOMA, TRANSITIONAL CELL, 579
  CARCINOMA
    RNA, 5998*
  CHOLANTHRENE, 3-METHYL-
    BINDING, MOUSE EMBRYO, 5602*
    DOSE-RESPONSE STUDY, 5602*
  CORTISOL
    CELL CYCLE KINETICS, 5950*
    FIBROBLASTS, 5950*
  LIVER REGENERATION
    TEMPLATE CAPACITY, 5927*, 5999*
  NEOPLASMS
    ISOLATION AND CHARACTERIZATION, REVIEW, 5473
  RNA
    ISOLATION AND CHARACTERIZATION, 5998*
  RNA POLYMERASE
    LIVER REGENERATION, 5927*
  RNA REPLICATION
    CELL CYCLE KINETICS, REVIEW, 547
  SODIUM CHLORIDE
    CELL CYCLE KINETICS, REVIEW, 547
  ULTRAVIOLET RAYS
    CATIONS, DIVALENT, 5635*
    DNA, CROSS-LINKING, 5635*
    OVARY, HAMSTER, 5635*
    SODIUM CHLORIDE, 5635*

CHROMIUM
  ENVIRONMENTAL HAZARD
    CARCINOGENIC POTENTIAL, REVIEW, 5489*

CHROMOSOME ABERRATIONS
  ACETAMIDE, N-(ACETYLOXY)-N-9H-FLUORE 2-YL-
    HYPERTENSION, 5595*
  ATAXIA TELANGIECTASIA
    LYMPHOCYTES, REVIEW, 5455
  BURKITT'S LYMPHOMA
    CELL TRANSFORMATION, NEOPLASTIC, REVIEW, 5439
  CARCINOGEN, CHEMICAL
    CELL TRANSFORMATION, NEOPLASTIC, REVIEW, 5453
    MUTAGENIC ACTIVITY, REVIEW, 5401
  CELL MEMBRANE
    CELL TRANSFORMATION, NEOPLASTIC, REVIEW, 5443
  CYCLOHEXYLAMINE
    SPERMATOZOA, 5612*
  CYCLOPHOSPHAMIDE
    SPERMATOZOA, 5612*
  IODINE RADIOISOTOPES
    HYPOTHYROIDISM, 5631*
  LEUKEMIA
    PURINE-6-THIOL, 5805
  LEUKEMIA, LYMPHOBLASTIC
    DIAGNOSIS AND PROGNOSIS, 5527*
  LEUKEMIA, LYMPHOCYTIC

    DIAGNOSIS AND PROGNOSIS, 5527*
  LEUKEMIA, MYELOBLASTIC
    DIAGNOSIS AND PROGNOSIS, 5527*
  LEUKEMIA, MYELOCYTIC
    BONE MARROW CELLS, 5807
    DIAGNOSIS AND PROGNOSIS, 5527*
    LYMPHOID TISSUE, 5807
  MELANOMA
    KARYOTYPING, 5793
  NEOPLASMS
    BINDING STUDY, REVIEW, 5526*
  NOGALAMYCIN
    LEUKOCYTES, 5613*
    SPERMATOZOA, 5613*
  ONCOGENIC VIRUSES
    CELL TRANSFORMATION, NEOPLASTIC, REVIEW, 5453
  RADIATION, IONIZING
    CELL TRANSFORMATION, NEOPLASTIC, REVIEW, 5453
  SCREENING, CARCINOGENIC CHEMICALS
    REVIEW, 5425
  THYROID NEOPLASMS
    CASE REPORT, 5816*
    CHROMOSOMES, HUMAN, 13-15, 5816*
    LYMPHOMA, 5816*

OMOSOME ABNORMALITIES
  MELANOMA
    CELLULOSE, METHYL ETHER, 5833*
    NEOPLASM METASTASIS, 5833*

OMOSOMES
  BENZ(A)ANTHRACENE
    ARYL HYDROCARBON HYDROXYLASES, 5570
  CELL TRANSFORMATION, NEOPLASTIC
    REVIEW, 5457
  GLIOMA
    DNA, 5797
  NEOPLASMS, EXPERIMENTAL
    HYBRID CELLS, 5450
  NEUROBLASTOMA
    AZAQUANINE-RESISTANT MUTANTS, 5796
    THIOGUANINE-RESISTANT MUTANTS, 5796
  VIRUS, RAUSCHER MURINE LEUKEMIA
    VIRUS REPLICATION, 5704*
  VIRUS, SV40
    CELL TRANSFORMATION, NEOPLASTIC, 5672
    PROTEINS, 5672

MOSOMES, HUMAN, 13-15
  THYROID NEOPLASMS
    CHROMOSOME ABERRATIONS, 5816*

MOSOMES, HUMAN, 21-22
  BREAST NEOPLASMS
    LEUKEMIA, MYELOCYTIC, 5814*
  LEUKEMIA, MYELOCYTIC
    ANTIBODY SPECIFICITY, 5740
    ANTIGENS, NEOPLASM, 5740
    CHROMOSOME ABERRATIONS, REVIEW, 5453

SOTILE
  SEE ASBESTOS

CHYMOTRYPSIN
  MAMMARY NEOPLASMS, EXPERIMENTAL
    ADENOCARCINOMA, 5959*

CITRIC ACID
  MAMMARY NEOPLASMS, EXPERIMENTAL
    LIVER, 5969*
  SARCOMA
    LIVER, 5969*

CITRININ
  KIDNEY NEOPLASMS
    ADENOCARCINOMA, 5578
    CARCINOGENIC POTENTIAL, 5578
    DIMETHYLAMINE, N-NITROSO-, 5578
    SUCCINIMIDE, N-(3,5-DICHLOROPHENYL)-, 5578
    TERATOID TUMOR, 5578

CLONE CELLS
  VIRUS, SV40
    CELL TRANSFORMATION, NEOPLASTIC, 5714*

COBALT RADIOISOTOPES
  BLOOD VESSELS
    ULTRASTRUCTURAL STUDY, RAT, 5626*

COENZYME A
  MAMMARY NEOPLASMS, EXPERIMENTAL
    LIVER, 5969*
  SARCOMA
    LIVER, 5969*

COLCHICINE
  FIBROBLASTS
    MICROTUBULES, 5775*
  MACROPHAGES
    MICROTUBULES, 5775*

COLITIS, ULCERATIVE
  CARCINOEMBRYONIC ANTIGEN
    SERUM LEVELS, 5753*

COLLAGEN
  CARCINOMA, BASAL CELL
    ULTRASTRUCTURAL STUDY, 5836*
  MAMMARY NEOPLASMS, EXPERIMENTAL
    ADENOCARCINOMA, 5938*

COLONIC NEOPLASMS
  ADENOCARCINOMA
    CARCINOEMBRYONIC ANTIGEN, 5753*
  AGE FACTORS
    CELL TRANSFORMATION, NEOPLASTIC, 5856*
    SINGLE GENE HYPOTHESIS, 5856*
  AUTOSOME ABNORMALITIES
    CASE REPORT, 5829*
  CARCINOEMBRYONIC ANTIGEN
    AMINO ACIDS, 5725
  DIET
    EPIDEMIOLOGY, 5901*
    EPIDEMIOLOGY, BOLIVIA, 5892*
  GENES, RECESSIVE
    CELL TRANSFORMATION, NEOPLASTIC, 5856*
  HYDRAZINE, 1,2-DIMETHYL-
    NUCLEOPROTEINS, 5990*

  - NUCLEOPROTEINS
    - CELL TRANSFORMATION, NEOPLASTIC, 5990*
  - SEBACEOUS CYST
    - CASE REPORT, 5829*

- COMPLEMENT
  - HISTOCOMPATIBILITY ANTIGENS
    - IMMUNE RESPONSE, 5767*
  - B-LYMPHOCYTES
    - CELL MEMBRANE, 5767*
    - HISTOCOMPATIBILITY ANTIGENS, 5767*
    - ISOANTIGENS, 5767*

- CONCANAVALIN A
  - CARBOHYDRATES
    - CELL MEMBRANE, 5909
  - CELL MEMBRANE
    - ULTRASTRUCTURAL STUDY, 5909
  - IMMUNE SERUMS
    - CELL MEMBRANE, 5909
  - LEUKEMIA L1210
    - IMMUNE RESPONSE, 5933*
  - T-LYMPHOCYTES
    - IMMUNE RESPONSE, REVIEW, 5447
  - LYMPHOSARCOMA
    - BINDING, 5958*
  - MAMMARY NEOPLASMS, EXPERIMENTAL
    - ADENOCARCINOMA, 5959*
  - PEROXIDASES
    - CELL MEMBRANE, 5909

- CONDYLOMATA ACUMINATA
  - VIRUS, PAPILLOMA
    - EPIDEMIOLOGY, 5681

- CONJUNCTIVITIS
  - ULTRAVIOLET RAYS
    - DOSE-RESPONSE STUDY, REVIEW, 5501*

- CONTACT INHIBITION
  - CELL MEMBRANE
    - CELL TRANSFORMATION, NEOPLASTIC, REVIEW, 5443
  - HEPATOMA
    - CELL LINE, 5467
  - MICROTUBULES
    - FIBROBLASTS, 5775*
  - SARCOMA
    - ULTRASTRUCTURAL STUDY, MOUSE, 5967*
  - VIRUS, MURINE SARCOMA
    - GLUCOSEPHOSPHATE DEHYDROGENASE, 5662
    - HEXOKINASE, 5662
    - PHOSPHOFRUCTOKINASE, 5662
    - PHOSPHOGLUCONATE DEHYDROGENASE, 5662

- CONTRACEPTIVES, ORAL
  - BREAST NEOPLASMS
    - EPIDEMIOLOGY, REVIEW, 5417
    - HISTOLOGICAL STUDY, REVIEW, 5494*
    - REVIEW, 5423
  - CERVIX NEOPLASMS
    - CARCINOMA IN SITU, 5868
    - PRECANCEROUS CONDITIONS, 5868
  - ESTRIOL
    - CARCINOGENIC ACTIVITY, REVIEW, 5417
  - ESTROGENS
    - REVIEW, 5423
  - GYNECOLOGIC NEOPLASMS
    - HISTOLOGICAL STUDY, REVIEW, 5494
  - HEPATOMA
    - CARCINOGENIC ACTIVITY, 5555
    - EPIDEMIOLOGY, 5605*
  - LIVER NEOPLASMS
    - ADENOMA, 5557
    - CASE REPORT, 5557
    - HISTOLOGICAL STUDY, REVIEW, 5494
    - REVIEW, 5557
  - NEOPLASMS, VASCULAR TISSUE
    - HISTOLOGICAL STUDY, REVIEW, 5494
  - UTERINE NEOPLASMS
    - REVIEW, 5423

- CORTISOL
  - BREAST
    - DNA REPLICATION, 5560
    - ULTRASTRUCTURAL STUDY, 5560
  - CHROMATIN
    - CELL CYCLE KINETICS, 5950*
    - FIBROBLASTS, 5950*
  - MAMMARY NEOPLASMS, EXPERIMENTAL
    - PRECANCEROUS CONDITIONS, 5561
  - PITUITARY NEOPLASMS
    - GROWTH, 5552

- CORTISOL ACETATE
  - PITUITARY NEOPLASMS
    - GROWTH, 5552

- CORTISONE
  - NEOPLASMS
    - TRANSPLANTATION, HETEROLOGOUS, 5768*

- CORYNEBACTERIUM PARVUM
  - ONCOGENIC VIRUSES
    - IMMUNOTHERAPY, REVIEW, 5522*

- CROCIDOLITE
  - SEE ASBESTOS

- CRYOTHERAPY
  - FIBROSARCOMA
    - IMMUNE RESPONSE, RAT, 5748

- CYCLIC AMP
  - SEE ADENOSINE CYCLIC 3',5' MONOPHOSPHATE

- 4-CYCLOHEXENE-1,2-DICARBOXIMIDE, N-(TRICHLOROMETHYL)THIO-
  - BACTERIA
    - MUTAGENIC ACTIVITY, REVIEW, 542
  - NEUROSPORA CRASSA
    - MUTAGENIC ACTIVITY, REVIEW, 542
  - RODENTS
    - MUTAGENIC ACTIVITY, REVIEW, 542

- CYCLOHEXIMIDE
  - ACETAMIDE, N-(ACETYLOXY)-N-9H-FLUOR 2-YL-
    - DNA REPAIR, 5550
  - DEXAMETHASONE
    - MITOCHONDRIA, LIVER, 5925

- HEPATOMA
    - ISOBUTYRIC ACID, ALPHA-AMINO-, 5924
- MULTIPLE MYELOMA
    - IMMUNOGLOBULINS, LIGHT CHAIN, 5727
- NEOPLASMS
    - RNA REPLICATION, 5977*
- ULTRAVIOLET RAYS
    - DNA REPAIR, 5550
- VIRUS, ROUS SARCOMA
    - GLUCOSE, 2-DEOXY-, 5645
- YEASTS
    - RNA REPLICATION, 5977*

LOHEXYLAMINE
- SPERMATOZOA
    - CHROMOSOME ABERRATIONS, 5612*
    - MUTAGENIC ACTIVITY, HAMSTER, 5612*

LOPHOSPHAMIDE
- NEOPLASMS
    - TRANSPLANTATION, HETEROLOGOUS, 5768*
- PLASMACYTOMA
    - FACTOR XIII, 5945*
- SPERMATOZOA
    - CHROMOSOME ABERRATIONS, 5612*
    - MUTAGENIC ACTIVITY, HAMSTER, 5612*

LINDROMA
- EAR NEOPLASMS
    - EPIDEMIOLOGY, USSR, 5876

STADENOMA
- OVARIAN NEOPLASMS
    - DIAGNOSIS AND TREATMENT, 5533*

STADENOMA, MUCINOUS
- OVARIAN NEOPLASMS
    - DIAGNOSIS AND TREATMENT, 5533*

STADENOMA, PAPILLARY
- GASTROINTESTINAL NEOPLASMS
    - GENETICS, 5858*

STS
- CARCINOMA, BASAL CELL
    - CASE REPORT, 5788
- CELL TRANSFORMATION, NEOPLASTIC
    - CELLS, CULTURED, 5808*

TOCHROME OXIDASE
- MAMMAE
    - CELLS, CULTURED, 5972*

TOCHROME P-450
- ACETAMIDE, THIO-
    - MICROSOMES, LIVER, 5551
- HEPATOMA
    - ISOLATION AND CHARACTERIZATION, 5601*
    - PHENETHYLAMINE, N-BENZYL-N,ALPHA-DIMETHYL-, 5601*

TOCHROME REDUCTASES
- HEPATOMA
    - ISOLATION AND CHARACTERIZATION, 5601*
    - PHENETHYLAMINE, N-BENZYL-N,ALPHA-DIMETHYL-, 5601*

CYTOPATHOGENIC EFFECT, VIRAL
- VIRUS, ROUS SARCOMA
    - DNA, VIRAL, 5646

CYTOPLASM
- STEROIDS
    - BINDING, REVIEW, 5471
    - RNA REPLICATION, REVIEW, 5471

CYTOSINE, 1-BETA-D-ARABINOFURANOSYL-
- ACTIN
    - IMMUNE SERUMS, 5618*
- ANTIGEN-ANTIBODY REACTIONS
    - CELL TRANSFORMATION, NEOPLASTIC, 5618*
- IMMUNE SERUMS
    - CELL TRANSFORMATION, NEOPLASTIC, 5618*

CYTOSOL
- PLASMACYTOMA
    - PROTEIN KINASE, 5914

CYTOTOXICITY TESTS, IMMUNOLOGIC
- MAMMARY NEOPLASMS, EXPERIMENTAL
    - VIRUS, MURINE MAMMARY TUMOR, 5739

DECANE
- SKIN NEOPLASMS
    - BENZO(A)PYRENE, 5568

DEOXYRIBONUCLEASE
- LEUKEMIA, LYMPHOBLASTIC
    - ISOLATION AND CHARACTERIZATION, 5983*
    - LYMPHOCYTES, 5983*
- MAMMARY NEOPLASMS, EXPERIMENTAL
    - ADENOCARCINOMA, 5959*
- VIRUS, ADENO 1
    - ANTI-ANTIBODIES, 5682
    - ISOLATION AND CHARACTERIZATION, HEP-2 CELLS, 5682
    - TRYPSIN, 5682

DERMATITIS EXFOLIATIVA
- LYMPHOCYTES
    - IMMUNE RESPONSE, 5456
    - REVIEW, 5456
- SKIN NEOPLASMS
    - IMMUNE RESPONSE, 5456
    - REVIEW, 5456
    - SEZARY CELL, 5456

DESMOSOMES
- CARCINOMA, BASAL CELL
    - ULTRASTRUCTURAL STUDY, 5836*

DEXAMETHASONE
- CHLORAMPHENICOL
    - MITOCHONDRIA, LIVER, 5925
- CYCLOHEXIMIDE
    - MITOCHONDRIA, LIVER, 5925
- HEPATOMA
    - GLYCINE, 5924
    - ISOBUTYRIC ACID, ALPHA-AMINO-, 5924
- MITOCHONDRIA, LIVER

    - DNA REPLICATION, 5925
    - ULTRASTRUCTURAL STUDY, 5925
  - UREA, HYDROXY-
    - MITOCHONDRIA, LIVER, 5925

- DIBENZ(A,H)ANTHRACENE
  - ARYL HYDROCARBON HYDROXYLASES
    - EPIDERMIS, MOUSE, 5569
    - EPITHELIAL CELLS, 5548
  - CELL TRANSFORMATION, NEOPLASTIC
    - ARYL HYDROCARBON HYDROXYLASES, 5569

- DIBENZO-P-DIOXIN, 2,3,7,8-TETRACHLORO-
  - HYDROXYLASES
    - GENETICS, MOUSE, 5571

- DIBUTYRYL CYCLIC AMP
  - LEUKEMIA, LYMPHOCYTIC
    - DNA REPLICATION, 5730
  - LEUKEMIA, MYELOCYTIC
    - DNA REPLICATION, 5730
  - MELANOMA
    - CELL DIFFERENTIATION, 5834*
  - NEUROBLASTOMA
    - CARBOXY-LYASES, 5986*

- DIET
  - CARCINOGEN, CHEMICAL
    - COCARCINOGENESIS, REVIEW, 5490*
  - COLONIC NEOPLASMS
    - EPIDEMIOLOGY, 5901*
    - EPIDEMIOLOGY, BOLIVIA, 5892*
  - DIVERTICULOSIS, COLONIC
    - EPIDEMIOLOGY, 5901*
  - GASTROINTESTINAL NEOPLASMS
    - EPIDEMIOLOGY, REVIEW, 5464
  - INTESTINAL NEOPLASMS
    - EPIDEMIOLOGY, REVIEW, 5538*

- DIETARY FATS
  - INTESTINAL NEOPLASMS
    - EPIDEMIOLOGY, REVIEW, 5539*

- DIETARY PROTEINS
  - INTESTINAL NEOPLASMS
    - EPIDEMIOLOGY, REVIEW, 5539*

- DIETHYLAMINE, N-NITROSO-
  - CELL TRANSFORMATION, NEOPLASTIC
    - DOSE-RESPONSE STUDY, REVIEW, 5483*
  - GUANINE
    - DNA REPAIR, REVIEW, 5496*
  - HEPATOMA
    - SULFHYDRYL COMPOUNDS, REVIEW, 5907
  - LIVER
    - ULTRASTRUCTURAL STUDY, RAT, 5608*
  - LIVER NEOPLASMS
    - ADENOSINE TRIPHOSPHATASE, 5579
    - PRECANCEROUS CONDITIONS, 5579
  - NITROSAMINES
    - CARCINOGENIC POTENTIAL, FISH, 5577
  - PEPTIDE HYDROLASES
    - LIVER, RAT, 5608*

- DIETHYLNITROSAMINE
  - SEE DIETHYLAMINE, N-NITROSO-

- DIMETHYLAMINE, N,ALPHA-ACETOXY-N-NITROSO-
  - DIMETHYLAMINE, N-NITROSO-
    - NUCLEOPROTEINS, 5575
  - DNA
    - DNA-PROTEIN LINKAGE, 5575
  - DROSOPHILA MELANOGASTER
    - MUTAGENIC ACTIVITY, 5575

- DIMETHYLAMINE, N-NITROSO-
  - AGE FACTORS
    - OXIDOREDUCTASES, N-DEMETHYLATING, 5573
  - CELL TRANSFORMATION, NEOPLASTIC
    - KIDNEY, RAT, 5609*
  - CELLS, CULTURED
    - CELL TRANSFORMATION, NEOPLASTIC, 5609*
  - CHOLANTHRENE, 3-METHYL-
    - OXIDOREDUCTASES, N-DEMETHYLATING, 5573
  - DIMETHYLAMINE, N,ALPHA-ACETOXY-N-NITROSO-
    - NUCLEOPROTEINS, 5575
  - DISULFIDE, BIS(DIMETHYLTHIIOCARBAMOYL)
    - NITROUS ACID, 5574
  - DNA
    - DNA-PROTEIN LINKAGE, 5575
  - DROSOPHILA MELANOGASTER
    - MUTAGENIC ACTIVITY, 5575
    - NUCLEOPROTEINS, 5575
  - FOOD CONTAMINATION
    - CHROMATOGRAPHIC STUDY, 5580
  - KIDNEY NEOPLASMS
    - CITRININ, 5578
  - LIVER
    - ULTRASTRUCTURAL STUDY, RAT, 5608*
  - LIVER NEOPLASMS
    - ADENOSINE TRIPHOSPHATASE, 5579
    - PRECANCEROUS CONDITIONS, 5579
  - NUCLEIC ACIDS
    - KIDNEY, RAT, 5609*
  - OXIDOREDUCTASES, N-DEMETHYLATING
    - LIVER, RAT, 5573
  - PHOSPHORODIAMIDIC FLUORIDE, TETRAMETHYL-
    - NITROUS ACID, 5574
  - UREA, 3-CYCLOOCTYL-1,1-DIMETHYL-
    - NITROUS ACID, 5574
  - UREA, 3-(P-(P-CHLOROPHENOXY)PHENYL)-1 1-DIMETHYL-
    - NITROUS ACID, 5574

- DIMETHYLAMINE, N-NITROSO-, ACETATE
  - RNA
    - METABOLISM, BACTERIOPHAGE, 5576

- DIMETHYLAMINOAZOBENZENE
  - SEE ANILINE, N,N-DIMETHYL-P-PHENYLAZ

- DIMETHYLBENZANTHRACENE
  - SEE BENZ(A)ANTHRACENE, 7,12-DIMETHYL-

- DIPHENOL OXIDASES
  - MELANOMA
    - GROWTH, 5952*
    - MSH, 5952*
    - ULTRASTRUCTURAL STUDY, 5792

- DIPROPYLAMINE, N-NITROSO-

  - LIVER
    - ULTRASTRUCTURAL STUDY, RAT, 5608*
  - PEPTIDE HYDROLASES
    - LIVER, RAT, 5608*

- ISGERMINOMA
  - OVARIAN NEOPLASMS
    - DIAGNOSIS AND TREATMENT, 5533*
  - TESTICULAR NEOPLASMS
    - CASE REPORT, BILATERAL TUMOR, 5826*

- ISULFIDE, BIS(DIMETHYLTHIIOCARBAMOYL)-
  - NITROUS ACID
    - DIMETHYLAMINE, N-NITROSO-, 5574

- IVERTICULOSIS, COLONIC
  - DIET
    - EPIDEMIOLOGY, 5901*

- IA
  - ACTINOMYCIN D
    - REVIEW, 5426
  - ALKYLATING AGENTS
    - REVIEW, 5426
  - BENZ(A)ANTHRACENE, 7,12-DIMETHYL-
    - BINDING, LYMPHOCYTES, 5595*
    - HYPERTENSION, 5595*
  - BENZO(A)PYRENE
    - REVIEW, 5426
  - BLADDER NEOPLASMS
    - CARCINOMA, TRANSITIONAL CELL, 5798
  - CARBAMIC ACID, ETHYL ESTER
    - BINDING, LIVER, MOUSE, 5585
    - HEPATECTOMY, 5585
  - CARCINOGEN, CHEMICAL
    - MUTAGENIC ACTIVITY, REVIEW, 5401
  - DIMETHYLAMINE, N,ALPHA-ACETOXY-N-NITROSO-
    - DNA-PROTEIN LINKAGE, 5575
  - DIMETHYLAMINE, N-NITROSO-
    - DNA-PROTEIN LINKAGE, 5575
  - EPITHELIAL CELLS
    - CELL DIFFERENTIATION, 5974*
  - ERYTHREMIC MYELOSIS
    - BONE MARROW CELLS, 5827*
  - FORMALDEHYDE
    - REVIEW, 5426
  - GLIOMA
    - CHOLANTHRENE, 3-METHYL-, 5797
    - CHROMOSOMES, 5797
  - GROWTH
    - FIBROBLASTS, 5472
  - HEPATOMA
    - METABOLISM, REVIEW, 5478
  - MELANOMA
    - DNA-RNA HYBRIDIZATION, 5718*
  - METHANESULFONIC ACID, METHYL ESTER
    - REVIEW, 5426
  - NITROUS ACID
    - REVIEW, 5426
  - PITUITARY NEOPLASMS
    - ACROMEGALY, 5783
  - ULTRAVIOLET RAYS
    - CELL TRANSFORMATION, NEOPLASTIC, 5629*
    - REVIEW, 5428
  - VIRUS, SV40
    - CELL TRANSFORMATION, NEOPLASTIC, 5672

- DNA, BACTERIAL
  - RADIATION, IONIZING
    - PROTEINS, 5427
  - ULTRAVIOLET RAYS
    - PROTEINS, 5427

- DNA NUCLEOTIDYLTRANSFERASES
  - VIRUS, AVIAN MYELOBLASTOSIS
    - BERYLLIUM, 5611*

- DNA POLYMERASE
  - SEE ALSO DNA NUCLEOTIDYLTRANSFERASES
  - ALPHA-AMANITINE
    - LIVER REGENERATION, 5991*

- DNA REPAIR
  - ACETAMIDE, N-(ACETYLOXY)-N-9H-FLUOREN-2-YL-
    - CYCLOHEXIMIDE, 5550
    - DOSE-RESPONSE STUDY, 5550
    - HYPERTENSION, 5595*
    - XERODERMA PIGMENTOSUM, 5622
  - ALKYLATING AGENTS
    - CARCINOGENIC ACTIVITY, REVIEW, 5424
    - MUTAGENIC ACTIVITY, REVIEW, 5424
  - CARCINOGEN, CHEMICAL
    - BIOASSAY, 5931*
    - CARCINOGEN PRESCREENING, 5617*
    - EPIDERMIS, MOUSE, REVIEW, 5484*
    - FIBROBLASTS, 5617*
    - SEDIMENTATION ANALYSIS, 5931*
  - DOSE-RESPONSE STUDY
    - ULTRAVIOLET RAYS, 5550
  - HELA CELLS
    - BUTANE, 1,2:3,4-DIEPOXY-, 5586
    - ENDONUCLEASES, 5586
    - METHANESULFONIC ACID, METHYL ESTER, 5586
    - 2-OXETANONE, 5586
    - UREA, METHYL NITROSO-, 5586
  - LYMPHOMA
    - GUANIDINE, 1-METHYL-3-NITRO-1-NITROSO-, 5581, 5583
    - URIDINE, 2'-DEOXY-5-IODO-, 5583
  - METHANESULFONIC ACID, ETHYL ESTER
    - XERODERMA PIGMENTOSUM, 5622
  - METHANESULFONIC ACID, METHYL ESTER
    - MAMMAE, 5588
  - RADIATION, IONIZING
    - ESCHERICHIA COLI, 5427
    - XERODERMA PIGMENTOSUM, 5622
  - SCREENING, CARCINOGENIC CHEMICALS
    - REVIEW, 5425
  - SKIN DISEASES
    - LIGHT, 5624
    - ULTRAVIOLET RAYS, 5624
  - ULTRAVIOLET RAYS
    - CYCLOHEXIMIDE, 5550
    - ESCHERICHIA COLI, 5427
    - REVIEW, 5428
    - XERODERMA PIGMENTOSUM, 5622
  - UREA, METHYL NITROSO-
    - MAMMAE, 5588
  - VIRUS, ADENO 12
    - SCREENING, CARCINOGENIC CHEMICALS, 5425

- VIRUS, HERPES SIMPLEX 1
    - ULTRAVIOLET RAYS, 5695
- XERODERMA PIGMENTOSUM
    - COLONY FORMATION, 5639*
    - LIGHT, 5624
    - ULTRAVIOLET RAYS, 5624, 5630*, 5639*

DNA REPLICATION
- ALKALINE PHOSPHATASE
    - LIVER REGENERATION, 5994*
- BENZO(A)PYRENE
    - ESTRADIOL, 5666
- BERYLLIUM
    - MUTAGENIC ACTIVITY, 5611*
- CHALONES
    - CELL CYCLE KINETICS, 5944*
    - INTESTINES, 5968*
- CORTISOL
    - BREAST, 5560
- DEXAMETHASONE
    - MITOCHONDRIA, LIVER, 5925
- DNA, VIRAL
    - TEMPERATURE SENSITIVE MUTANTS, 5678
- ESTRADIOL
    - PITUITARY GLAND, RAT, 5956*
- ETHIDIUM BROMIDE
    - MITOCHONDRIA, LIVER, 5925
- GUANIDINE, 1-METHYL-3-NITRO-1-NITROSO
    - ESTRADIOL, 5666
- HELA CELLS
    - VIRUS, VACCINIA, 5679
- HODGKIN'S DISEASE
    - LYMPH NODES, 5859*
- INSULIN
    - BREAST, 5560
- LEUKEMIA
    - ALKALINE PHOSPHATASE, 5994*
    - CELL CYCLE KINETICS, 5903
    - PURINE-6-THIOL, 5805
    - UREA, HYDROXY-, 5903
- LEUKEMIA, LYMPHOBLASTIC
    - LYMPHOCYTE TRANSFORMATION, 5884
- LEUKEMIA, LYMPHOCYTIC
    - DIBUTYRYL CYCLIC AMP, 5730
- LEUKEMIA, MYELOBLASTIC
    - LYMPHOCYTE TRANSFORMATION, 5884
- LEUKEMIA, MYELOCYTIC
    - DIBUTYRYL CYCLIC AMP, 5730
- LYMPHOMA
    - GUANIDINE, 1-METHYL-3-NITRO-1-NITROSO-, 5583
    - URIDINE, 2'-DEOXY-5-IODO-, 5583
- NUCLEOTIDASES
    - LIVER REGENERATION, 5994*
- PROLACTIN
    - BREAST, 5560
- RADIATION, IONIZING
    - CELL CYCLE KINETICS, 5634*
    - FIBROBLASTS, HAMSTER OVARY, 5634*
- TEMPERATURE SENSITIVE MUTANTS
    - CELL CYCLE KINETICS, 5678
- THYRONINE
    - LYMPHOCYTES, 5923
- THYROXINE
    - LYMPHOCYTES, 5923
- VIRUS, DNA TUMOR
    - REVIEW, 5519*
- VIRUS, POLYOMA
    - TEMPERATURE SENSITIVE MUTANTS, 5678
- VIRUS, SV40
    - BENZO(A)PYRENE, 5666
    - ESTRADIOL, 5666
    - GUANIDINE, 1-METHYL-3-NITRO-1-NITROSO-, 5666
    - VIRUS REPLICATION, 5669

DNA, SINGLE STRANDED
- LYMPHOMA
    - GUANIDINE, 1-METHYL-3-NITRO-1-NITROSO-, 5581
- URIDINE, 5-BROMO-2'-DEOXY-
    - EMBRYO, RAT, 5709*

DNA, VIRAL
- BURKITT'S LYMPHOMA
    - CELL TRANSFORMATION, NEOPLASTIC, REVIEW, 5439
- DNA REPLICATION
    - TEMPERATURE SENSITIVE MUTANTS, 5678
- VIRUS, ADENO 2
    - ISOLATION AND CHARACTERIZATION, 5683
- VIRUS, ADENO 5
    - CELL TRANSFORMATION, NEOPLASTIC, 5686
    - DNA-RNA HYBRIDIZATION, 5686
    - REASSOCIATION KINETICS, 5686
- VIRUS, AVIAN LEUKOSIS-SARCOMA
    - ANTIGENIC DETERMINANTS, 5642
    - DNA-RNA HYBRIDIZATION, 5642
    - VIRAL PROTEINS, 5642
- VIRUS, AVIAN SARCOMA
    - DNA-DNA HYBRIDIZATION, 5643
    - NUCLEOTIDES, 5643
- VIRUS, HERPES SIMPLEX
    - ISOLATION AND CHARACTERIZATION, REVIEW, 5437
- VIRUS, MAREK'S DISEASE HERPES
    - BINDING, 5641
    - DNA-RNA HYBRIDIZATION, 5641
- VIRUS, MURINE LEUKEMIA
    - DNA-DNA HYBRIDIZATION, 5656
    - VIRUS REPLICATION, 5656
- VIRUS, POLYOMA
    - CELL CYCLE KINETICS, 5678
- VIRUS, ROUS SARCOMA
    - CELL TRANSFORMATION, NEOPLASTIC, 5646
    - CYTOPATHOGENIC EFFECT, VIRAL, 564
    - ISOLATION AND CHARACTERIZATION, FIBROBLASTS, 5647
    - OLIGONUCLEOTIDES, 5647
    - REVIEW, 5646
    - TRANSFORMATION-DEFECTIVE MUTANTS, 5646
    - TRANSFORMATION, GENETIC, 5646
- VIRUS, SV40
    - DNA-DNA HYBRIDIAZATION, 5670
    - ENDONUCLEASES, 5675
    - ISOLATION AND CHARACTERIZATION, 5670
    - VIRAL PROTEINS, 5675
    - VIRUS REPLICATION, 5669, 5670
- VIRUS, VACCINIA

- ETHANOL, 2-MERCAPTO-, 5721*
- ISOLATION AND CHARACTERIZATION, 5721*

DROSOPHILA MELANOGASTER
- DIMETHYLAMINE, N,ALPHA-ACETOXY-N-NITROSO-
  - MUTAGENIC ACTIVITY, 5575
- DIMETHYLAMINE, N-NITROSO-
  - MUTAGENIC ACTIVITY, 5575
  - NUCLEOPROTEINS, 5575

DRUG THERAPY
- BREAST NEOPLASMS
  - PROGNOSIS, MALE, REVIEW, 5460
- LEUKEMIA L1210
  - IMMUNITY, PASSIVE, 5933*

DRUGS
- ANIMALS, LABORATORY
  - CARCINOGENIC POTENTIAL, REVIEW, 5481*
- CARCINOGENIC POTENTIAL
  - DATA EXTRAPOLATION, REVIEW, 5482*

DUODENAL ULCER
- CARCINOID TUMOR
  - CASE REPORT, 5863*
- INTESTINAL NEOPLASMS
  - CARCINOID TUMOR, 5863*

EAR NEOPLASMS
- ADENOCARCINOMA
  - EPIDEMIOLOGY, USSR, 5876
- CARCINOMA, BASAL CELL
  - EPIDEMIOLOGY, USSR, 5876
- CARCINOMA, EPIDERMOID
  - EPIDEMIOLOGY, USSR, 5876
- CYLINDROMA
  - EPIDEMIOLOGY, USSR, 5876
- MELANOMA
  - EPIDEMIOLOGY, USSR, 5876

EHRLICH ASCITES CARCINOMA
- SEE CARCINOMA, EHRLICH TUMOR

ELECTROLYTES
- HYDROLASES
  - STAPHYLOCOCCUS, 5761*

EMBOLISM
- NEOPLASM METASTASIS
  - CELL FUSION, 5540*
  - REVIEW, 5540*

ENDOCRINE GLAND NEOPLASMS
- NEOPLASTIC ENDOCRINE-LIKE SYNDROMES
  - REVIEW, 5458
- RADIATION, IONIZING
  - CARCINOGENIC POTENTIAL, REVIEW, 5430

ENDOMETRIOSIS
- TURNER'S SYNDROME
  - ADENOCARCINOMA, 5825*

ENDOMETRIUM
- ESTRADIOL
  - ULTRASTRUCTURAL STUDY, RABBIT, 5953*
- INSULIN
  - ULTRASTRUCTURAL STUDY, RABBIT, 5953*
- PROGESTERONE
  - ULTRASTRUCTURAL STUDY, RABBIT, 5953*

ENDONUCLEASES
- HELA CELLS
  - DNA REPAIR, 5586
- VIRUS, ADENO 1
  - ISOLATION AND CHARACTERIZATION, HEP-2 CELLS, 5682
- VIRUS, SV40
  - DNA, VIRAL, 5675
  - VIRAL PROTEINS, 5675

ENDOPLASMIC RETICULUM
- HEPATOMA
  - NUCLEOTIDES, CYCLIC, 5912
  - PHOSPHOPROTEINS, 5913
  - PROTEIN KINASE, 5913
- ISOBUTYRIC ACID, ALPHA-AMINO-
  - CELL TRANSFORMATION, NEOPLASTIC, 5674

ENVIRONMENTAL HAZARD
- ARSENIC
  - CARCINOGENIC POTENTIAL, REVIEW, 5489*
- BERYLLIUM
  - CARCINOGENIC POTENTIAL, REVIEW, 5489*
- CADMIUM
  - CARCINOGENIC POTENTIAL, REVIEW, 5489*
- CARCINOGEN, CHEMICAL
  - RISK EVALUATION, REVIEW, 5492*
- CHROMIUM
  - CARCINOGENIC POTENTIAL, REVIEW, 5489*
- ETHYLENE, CHLORO-
  - RISK EVALUATION, REVIEW, 5492*
- LEAD
  - CARCINOGENIC POTENTIAL, REVIEW, 5489*
- MYCOTOXINS
  - RISK EVALUATION, REVIEW, 5492*
- NICKEL
  - CARCINOGENIC POTENTIAL, REVIEW, 5489*
- NITROSO COMPOUNDS
  - RISK EVALUATION, REVIEW, 5492*
- POLYCYCLIC HYDROCARBONS
  - RISK EVALUATION, REVIEW, 5492*
- TRACE ELEMENTS
  - CARCINOGENIC POTENTIAL, REVIEW, 5489*

ENVIRONMENTAL POLLUTANTS
- CARCINOGEN, CHEMICAL
  - RISK EVALUATION, REVIEW, 5500*
- TRACE ELEMENTS
  - INSTRUMENTATION, REVIEW, 5493*
  - SAMPLING AND ANALYSIS, REVIEW, 5493*

ENZYMES

- CELL MEMBRANE
    - CELL TRANSFORMATION, NEOPLASTIC, REVIEW, 5960*

EPENDYMOMA
- NERVOUS SYSTEM NEOPLASMS
    - UREA, 3-ACETYL-1-METHYL-1-NITROSO-, 5587

ERGOLINES
- PITUITARY NEOPLASMS
    - ADENOMA, 5843*
    - PROLACTIN, 5843*
    - ULTRASTRUCTURAL STUDY, 5843*

ERYTHEMA
- ULTRAVIOLET RAYS
    - DOSE-RESPONSE STUDY, REVIEW, 5501*

ERYTHREMIC MYELOSIS
- BONE MARROW CELLS
    - CASE REPORT, 5827*
    - DNA, 5827*
- CELL DIFFERENTIATION
    - CASE REPORT, 5827*

ERYTHROCYTES
- VIRUS, SENDAI
    - RNA, TRANSFER, 5698

ERYTHRODERMA
- LYMPHOCYTES
    - CLASSIFICATION, 5752*
- MYCOSIS FUNGOIDES
    - SEZARY CELLS, 5832*

ESCHERICHIA COLI
- RADIATION, IONIZING
    - DNA REPAIR, 5427
- ULTRAVIOLET RAYS
    - DNA REPAIR, 5427

ESCULIN
- SKIN NEOPLASMS
    - BENZO(A)PYRENE, 5568

ESTRADIOL
- ACETAMIDE, THIO-
    - MICROSOMES, LIVER, 5551
- ALPHA GLOBULINS
    - LIVER, RAT, 5975*
- BENZO(A)PYRENE
    - DNA REPLICATION, 5666
- DNA REPLICATION
    - PITUITARY GLAND, RAT, 5956*
- ENDOMETRIUM
    - ULTRASTRUCTURAL STUDY, RABBIT, 5953*
- GUANIDINE, 1-METHYL-3-NITRO-1-NITROSO-
    - DNA REPLICATION, 5666
- LIPOPROTEINS
    - XENOPUS LAEVUS, 5954*
- LIVER
    - ULTRASTRUCTURAL STUDY, 5954*
- NUCLEOTIDASES
    - PITUITARY GLAND, RAT, 5956*
- OVALBUMIN
    - OVIDUCTS, CHICK, 5922
- PITUITARY NEOPLASMS
    - GROWTH, 5552
    - IMIDAZOLE-2-THIOL, 1-METHYL-, 5553
    - URACIL, 6-PROPYL-2-THIO-, 5553
- PROGESTERONE
    - HISTOLOGICAL SUTDY, 5951*
- PROLACTIN
    - PITUITARY GLAND, RAT, 5956*
- RNA, MESSENGER
    - LIVER, RAT, 5975*
    - OVIDUCTS, CHICK, 5922
- RNA POLYMERASE
    - OVIDUCTS, CHICK, 5922
- UTERINE NEOPLASMS
    - NUCLEIC ACIDS, 5951*
- VIRUS, SV40
    - DNA REPLICATION, 5666

ESTRIOL
- CONTRACEPTIVES, ORAL
    - CARCINOGENIC ACTIVITY, REVIEW, 5417

ESTROGENS
- BREAST NEOPLASMS
    - EPIDEMIOLOGY, 5536*
    - REVIEW, 5423
- CONTRACEPTIVES, ORAL
    - REVIEW, 5423
- GLYCOPROTEINS
    - ENDOMETRIUM, RABBIT, 5953*
- LYMPHOSARCOMA
    - PLANT AGGLUTININS, BINDING, 5958*
- PITUITARY NEOPLASMS
    - GROWTH, 5552, 5554
- RECEPTORS, HORMONE
    - ENDOMETRIUM, RAT, 5949*
- UTERINE NEOPLASMS
    - HORMONE REPLACEMENT THERAPY, 5419
    - MENOPAUSE, 5419
    - RECEPTORS, HORMONE, 5949*
    - REVIEW, 5423

ETHANE, 2-BROMO-2-CHLORO-1,1,1-TRIFLUORO-
- LUNG NEOPLASMS
    - NEOPLASM METASTASIS, 5741
- MAMMARY NEOPLASMS, EXPERIMENTAL
    - NEOPLASM METASTASIS, 5741
    - TRANSPLANTATION IMMUNOLOGY, 5741
- SARCOMA
    - NEOPLASM METASTASIS, 5741
    - TRANSPLANTATION IMMUNOLOGY, 5741

ETHANE, 1,1,1-TRICHLORO-2,2-BIS(P-CHLOROPHENYL)-
- LIVER NEOPLASMS
    - ENZYMATIC ACTIVITY, 5405

ETHANOL, 2-MERCAPTO-
- VIRUS, VACCINIA
    - DNA, VIRAL, 5721*

ETHIDIUM BROMIDE
- HELA CELLS
    - RNA, MESSENGER, 5973*
    - RNA REPLICATION, 5973*
- MITOCHONDRIA, LIVER
    - DNA REPLICATION, 5925

ETHNIC GROUPS

- LARYNGEAL NEOPLASMS
    - EPIDEMIOLOGY, OKLAHOMA, 5874

THYL ALCOHOL
- BREAST NEOPLASMS
    - EPIDEMIOLOGY, 5593

THYLENE, CHLORO-
- ANGIOSARCOMA
    - EPIDEMIOLOGY, ENGLAND, 5871
    - REVIEW, 5405
- 1,2,3-BENZOTHIADIAZOLE, 6-NITRO-
    - METABOLISM, RAT, 5592
- BONE NEOPLASMS
    - ANGIOSARCOMA, 5819*
    - CASE REPORT, 5819*
- ENVIRONMENTAL HAZARD
    - RISK EVALUATION, REVIEW, 5492*
- ETHANE, 1,1,1-TRICHLORO-,2-BIS(P-CHLOROPHENYL)-
    - METABOLISM, RAT, 5592
- 4-IMIDAZOLE, 3-BROMOPHENYL-
    - METABOLISM, RAT, 5592
- LIVER NEOPLASMS
    - ANGIOSARCOMA, 5819*
    - CASE REPORT, 5819*
- OCCUPATIONAL HAZARD
    - EPIDEMIOLOGY, ENGLAND, 5871
- OXIDOREDUCTASES
    - MUTAGENIC ACTIVITY, REVIEW, 5421
- VALERIC ACID, 2,2-DIPHENYL-, 2-(DIETHYLAMINO)ETHYL ESTER HCL
    - METABOLISM, RAT, 5592

YE NEOPLASMS
- MELANOMA
    - NEVUS, 5462

ACTOR XIII
- PLASMACYTOMA
    - CYCLOPHOSPHAMIDE, 5945*
    - SERUM LEVELS, 5945*

ALLOPIAN TUBE NEOPLASMS
- NEOPLASMS, EMBRYONAL AND MIXED
    - CASE REPORT, 5824*

ERRITIN
- VIRUS, MURINE LEUKEMIA
    - ANTIGEN-ANTIBODY REACTIONS, 5703*

ETAL GLOBULINS
- CHORIOCARCINOMA
    - ANTIGENIC DETERMINANTS, REVIEW, 5448
- HEPATITIS, INFECTIOUS
    - AUSTRALIA ANTIGEN, 5875
    - EPIDEMIOLOGY, SOUTH VIETNAM, 5875
- HEPATOMA
    - AUSTRALIA ANTIGEN, 5690, 5875
    - EPIDEMIOLOGY, SOUTH VIETNAM, 5875
- HISTOCOMPATIBILITY ANTIGENS
    - ANTIGENIC DETERMINANTS, REVIEW, 5448
- MALARIA
    - AUSTRALIA ANTIGEN, 5875
    - EPIDEMIOLOGY, SOUTH VIETNAM, 5875

FIBRINOGEN
- MAMMARY NEOPLASMS, EXPERIMENTAL
    - THROMBOPLASTIN, 5941*
- NEOPLASMS
    - THROMBOPLASTIN, 5941*

FIBRINOLYSIS
- INTESTINAL NEOPLASMS
    - CARCINOMA, 5800
    - NEOPLASM CIRCULATING CELLS, 5800
- MAMMARY NEOPLASMS, EXPERIMENTAL
    - THROMBOPLASTIN, 5941*
- NEOPLASMS
    - THROMBOPLASTIN, 5941*

FIBROBLASTS
- AGING
    - RNA, MESSENGER, 5928*
    - RNA REPLICATION, 5928*
- CARCINOGEN, CHEMICAL
    - DNA REPAIR, 5617*
- CELL TRANSFORMATION, NEOPLASTIC
    - INSULIN, 5926
- COLCHICINE
    - MICROTUBULES, 5775*
- CORTISOL
    - CHROMATIN, 5950*
- GROWTH
    - DNA, 5472
    - RIBOSOMES, 5472
    - RNA, MESSENGER, 5472
    - RNA, TRANSFER, 5472
- IMIDAZOLE, 4-(P-BROMOPHENYL)-
    - RNA, RIBOSOMAL, 5472
- LUNG NEOPLASMS
    - CELL TRANSFORMATION, NEOPLASTIC, 5905
    - KARYOTYPING, 5905
- MICROTUBULES
    - CONTACT INHIBITION, 5775*
- VIRUS, ROUS SARCOMA
    - MICROTUBULES, 5775*
- VIRUS, SV40
    - CELL TRANSFORMATION, NEOPLASTIC, 5672

FIBROSARCOMA
- BONE NEOPLASMS
    - TRANSPLANTATION, HOMOLOGOUS, 5930*
- CRYOTHERAPY
    - IMMUNE RESPONSE, RAT, 5748
- 2,5-HEXADIENOIC ACID, 3-METHOXY-5-METHYL-4-OXO-
    - ISOLATION AND CHARACTERIZATION, 5422
- MACROPHAGES
    - CHEMOTAXIS, INHIBITORY FACTOR, 5763*
- STOMACH NEOPLASMS
    - UREA, 3-ACETYL-1-METHYL-1-NITROSO-, 5587
- VIRUS, FELINE SARCOMA
    - DNA-RNA HYBRIDIZATION, 5655
- VIRUS, GUINEA PIG HERPES
    - ANTIBODIES, VIRAL, 5664
    - ANTIGENS, VIRAL, 5664
    - IMMUNOFLUORESCENCE STUDY, HAMSTER, 5664
    - ULTRASTRUCTURAL STUDY, HAMSTER, 5664

- VIRUS, MURINE LEUKEMIA
    - DNA-RNA HYBRIDIZATION, 5655
- VIRUS, MURINE SARCOMA
    - DNA-RNA HYBRIDIZATION, 5655
- VIRUS, RD-114
    - DNA-RNA HYBRIDIZATION, 5655
- VIRUS, SIMIAN SARCOMA
    - DNA-RNA HYBRIDIZATION, 5655

FLUORENYL ACETAMIDE
- SEE ACETAMIDE, N-FLUOREN-2-YL-

FOOD CONTAMINATION
- DIMETHYLAMINE, N-NITROSO-
    - CHROMATOGRAPHIC STUDY, 5580

    - CHROMATOGRAPHIC STUDY, 5580
- NITROUS ACID
    - CHROMATOGRAPHIC STUDY, 5580
- PIPERIDINE, 1-NITROSO-
    - CHROMATOGRAPHIC STUDY, 5580
- PYRROLIDINE, 1-NITROSO-
    - CHROMATOGRAPHIC STUDY, 5580

FORMALDEHYDE
- DNA
    - REVIEW, 5426
- VIRUS, FRIEND MURINE LEUKEMIA
    - CARCINOGENESIS, CHEMICAL, 5566
- VIRUS, ROUS SARCOMA
    - CARCINOGENESIS, CHEMICAL, 5566

FORMAMIDE, N,N-DIMETHYL-
- CARCINOMA, EHRLICH TUMOR
    - RIBONUCLEOTIDE REDUCTASES, 5916

2-FURALDEHYDE, 5-NITRO-, SEMICARBAZONE
- MICROSOMES, LIVER
    - REDUCTION PRODUCTS, ISOLATION AND CHARACTERIZATION, 5546
- XANTHINE OXIDASE
    - REDUCTION PRODUCTS, ISOLATION AND CHARACTERIZATION, 5546

2-FURANACRYLAMIDE, ALPHA-2-FURYL-5-NITRO-
- MICROSOMES, LIVER
    - REDUCTION PRODUCTS, ISOLATION AND CHARACTERIZATION, 5546
- XANTHINE OXIDASE
    - REDUCTION PRODUCTS, ISOLATION AND CHARACTERIZATION, 5546

GALACTOSE
- LYMPHOSARCOMA
    - PLANT AGGLUTININS, BINDING, 5958*
- PROSTAGLANDINS E
    - CELL TRANSFORMATION, NEOPLASTIC, 5939*
- URIDINE
    - CELL TRANSFORMATION, NEOPLASTIC, 5939*
- VIRUS, POLYOMA
    - CELL TRANSFORMATION, NEOPLASTIC, 5939*
    - METABOLISM, 5939*
- VIRUS, ROUS SARCOMA
    - CELL TRANSFORMATION, NEOPLASTIC, 5645

GALLBLADDER NEOPLASMS
- ADENOCARCINOMA, PAPILLARY
    - CASE REPORT, 5861*
    - HISTOLOGICAL STUDY, 5861*
- MELANOMA
    - CASE REPORT, 5791
    - HISTOLOGICAL STUDY, 5791
    - MELANOCYTES, 5791
- PAPILLOMA
    - CASE REPORT, 5861*
    - HISTOLOGICAL STUDY, 5861*

GANGLIOSIDES
- BENZ(A)ANTHRACENE, 7,12-DIMETHYL-
    - CELL TRANSFORMATION, NEOPLASTIC, 5603*
- CHOLANTHRENE, 3-METHYL-
    - CELL TRANSFORMATION, NEOPLASTIC, 5603*
- LIVER NEOPLASMS
    - ACETAMIDE, N-FLUOREN-2-YL-, 5598*

GASTROINTESTINAL NEOPLASMS
- ANEMIA, APLASTIC
    - GENETICS, 5806
- ASBESTOS
    - EPIDEMIOLOGY, REVIEW, 5486*
- ATAXIA TELANGIECTASIA
    - GENETICS, 5806
- CARCINOEMBRYONIC ANTIGEN
    - SERUM LEVELS, 5753*
- CYSTADENOMA, PAPILLARY
    - GENETICS, 5858*
- DIET
    - EPIDEMIOLOGY, REVIEW, 5464
- EPIDEMIOLOGY, SOCIOECONOMIC FACTORS
    - REVIEW, 5464
- GUANIDINE, 1-METHYL-3-NITRO-1-NITROSO-
    - MUCIN, 5582
    - SODIUM CHLORIDE, 5582
- HODGKIN'S DISEASE
    - HISTOLOGICAL STUDY, 5812*
- LYMPHOSARCOMA
    - HISTOLOGICAL STUDY, 5812*
- MYOCARDIAL INFARCT
    - EPIDEMIOLOGY, REVIEW, 5464
- NEOPLASMS, MULTIPLE PRIMARY
    - GENETICS, 5858*
    - POLYPS, 5858*
- OCCUPATIONAL HAZARD
    - EPIDEMIOLOGY, REVIEW, 5486*
- POLYPS
    - GENETICS, 5858*
- REVERSE TRANSCRIPTASE
    - ISOLATION AND CHARACTERIZATION, 5700
- RNA, VIRAL
    - DNA-RNA HYBRIDIZATION, 5700
    - ISOLATION AND CHARACTERIZATION, 5700
- TRANSPLANTATION, HETEROLOGOUS
    - IMMUNOSUPPRESSION, 5768*

GENES
- VIRUS, MURINE LEUKEMIA
    - VIRUS REPLICATION, 5656

GENES, RECESSIVE
- COLONIC NEOPLASMS

    - CELL TRANSFORMATION, NEOPLASTIC, 5856*

NETICS
- CELL CYCLE KINETICS
    - REVIEW, 5474
- CELL TRANSFORMATION, NEOPLASTIC
    - IMMUNE RESPONSE, REVIEW, 5444
    - REVIEW, 5457
- GASTROINTESTINAL NEOPLASMS
    - CYSTADENOMA, PAPILLARY, 5858*
    - NEOPLASMS, MULTIPLE PRIMARY, 5858*
    - POLYPS, 5858*
- GUANIDINE, 1-METHYL-3-NITRO-1-NITROSO-
    - PHOSPHOTRANSFERASES, ATP, 5638*
- HISTOCOMPATIBILITY ANTIGENS
    - IMMUNE RESPONSE, REVIEW, 5447
- LEUKEMIA, LYMPHOBLASTIC
    - EPIDEMIOLOGY, CHILD, 5882
- LEUKEMIA, MYELOBLASTIC
    - EPIDEMIOLOGY, CHILD, 5882
- LEUKEMIA, MYELOCYTIC
    - EPIDEMIOLOGY, CHILD, 5882
- NEOPLASMS
    - CHROMOSOME ABERRATIONS, REVIEW, 5453
    - RISK-FACTOR ANALYSIS, 5878
- PHEOCHROMOCYTOMA
    - CASE REPORT, 5785
- SARCOMA, EWING'S
    - EPIDEMIOLOGY, REVIEW, 5889*
- SARCOMA, OSTEOGENIC
    - EPIDEMIOLOGY, REVIEW, 5889*
- SEBACEOUS CYST
    - POLYPS, 5829*
- SKIN NEOPLASMS
    - REVIEW, 5789
- THYROID NEOPLASMS
    - CASE REPORT, 5785
    - PHEOCHROMOCYTOMA, 5785
- ULTRAVIOLET RAYS
    - PHOSPHOTRANSFERASES, ATP, 5638*

ANT CELL TUMORS
- BONE NEOPLASMS
    - TRANSPLANTATION, HOMOLOGOUS, 5930*

IOBLASTOMA MULTIFORME
- MELANOMA
    - ANTIGENIC DETERMINANTS, 5717*
- REVERSE TRANSCRIPTASE
    - ANTIBODY SPECIFICITY, 5717*
    - ISOLATION AND CHARACTERIZATION, 5717*
    - ULTRASTRUCTURAL STUDY, 5717*
- RNA, VIRAL
    - ISOLATION AND CHARACTERIZATION, 5717*

IOMA
- BRAIN NEOPLASMS
    - CASE REPORT, INFANT, 5847*
- CHOLANTHRENE, 3-METHYL-
    - C-TYPE PARTICLES, 5797
    - DNA, 5797
- DNA
    - CHROMOSOMES, 5797

UCOSE
- LYMPHOMA
    - CHOLESTEROL, 5961*

GLUCOSE, 2-DEOXY-
- VIRUS, ROUS SARCOMA
    - ACTINOMYCIN D, 5645
    - CELL TRANSFORMATION, NEOPLASTIC, 5645
    - CYCLOHEXIMIDE, 5645

GLUCOSEPHOSPHATE DEHYDROGENASE
- MELANOMA
    - URIDINE, 5-BROMO-2'-DEOXY-, 5919
- THYROID NEOPLASMS
    - PHEOCHROMOCYTOMA, 5785
- URIDINE, 5-BROMO-2'-DEOXY-
    - MUTAGENIC ACTIVITY, 5919
- VIRUS, MURINE SARCOMA
    - CELL TRANSFORMATION, NEOPLASTIC, 5662
    - CONTACT INHIBITION, 5662

GLUTAMYL TRANSPEPTIDASE
- LEUKEMIA, LYMPHOBLASTIC
    - B-LYMPHOCYTES, 5984*
    - T-LYMPHOCYTES, 5984*
- LEUKEMIA, MYELOBLASTIC
    - B-LYMPHOCYTES, 5984*
    - T-LYMPHOCYTES, 5984*
- MELANOMA
    - B-LYMPHOCYTES, 5984*
    - T-LYMPHOCYTES, 5984*

GLYCERALDEHYDEPHOSPHATE DEHYDROGENASE
- BENZ(A)ANTHRACENE, 7,12-DIMETHYL-
    - BINDING, RAT MAMMARY TISSUE, 5563
- BENZ(A)ANTHRACENE, 7-(METHOXYMETHYL)-12-METHYL-
    - BINDING, RAT MAMMARY TISSUE, 5563

GLYCINE
- HEPATOMA
    - DEXAMETHASONE, 5924
    - ISOBUTYRIC ACID, ALPHA-AMINO-, 5924

GLYCINONITRILE
- OXIDOREDUCTASES
    - MUTAGENIC ACTIVITY, REVIEW, 5421

GLYCOGEN
- CERVIX NEOPLASMS
    - PRECANCEROUS CONDITIONS, 5799

GLYCOGEN PHOSPHORYLASE
- CERVIX NEOPLASMS
    - PRECANCEROUS CONDITIONS, 5799

GLYCOGEN SYNTHETASE
- CERVIX NEOPLASMS
    - PRECANCEROUS CONDITIONS, 5799

GLYCOGENOSIS
- CARCINOMA, EHRLICH TUMOR
    - ULTRASTRUCTURAL STUDY, 5942*

GLYCOLYSIS
- THYMOMA
    - ENZYMATIC ACTIVITY, 5979*

- GLYCOPROTEINS
  - ESTROGENS
    - ENDOMETRIUM, RABBIT, 5953*
  - INSULIN
    - ENDOMETRIUM, RABBIT, 5953*
  - LEUKEMIA
    - ISOLATION AND CHARACTERIZATION, 5910
    - T-LYMPHOCYTES, 5910
  - LEUKEMIA, LYMPHOBLASTIC
    - CELL MEMBRANE, 5947*

- GOITER
  - THYROID DISEASES
    - ADENYL CYCLASE, 5846*

- GOITER, ENDEMIC
  - BREAST NEOPLASMS
    - EPIDEMIOLOGY, AFRICA, 5535*
  - GYNECOLOGIC NEOPLASMS
    - EPIDEMIOLOGY, AFRICA, 5535*

- GONADOTROPINS, CHORIONIC
  - CARCINOMA, TRANSITIONAL CELL
    - IMMUNITY, CELLULAR, 5732
  - HISTOCOMPATIBILITY ANTIGENS
    - ANTIGENIC DETERMINANTS, REVIEW, 5448
  - HYPERTHYROIDISM
    - ETIOLOGY, REVIEW, 5451

- GRAFT VS HOST REACTION
  - HISTOCOMPATIBILITY ANTIGENS
    - REVIEW, 5742
  - HODGKIN'S DISEASE
    - REVIEW, 5742
  - HYDANTOIN, 5,5-DIPHENYL-
    - REVIEW, 5742
  - IMMUNE COMPLEX DISEASE
    - REVIEW, 5742
  - INFECTIOUS MONONUCLEOSIS
    - REVIEW, 5742
  - LYMPHOMA
    - REVIEW, 5742
  - VIRUS, VACCINA
    - REVIEW, 5742

- GRANULOMA
  - LUNG NEOPLASMS
    - CASE REPORT, 5787
    - ULTRASTRUCTURAL STUDY, 5787

- GROWTH
  - CARCINOMA, EHRLICH TUMOR
    - CELL CYCLE KINETICS, 5899*, 5900*
    - DAMPING FUNCTION, 5900*
    - GLYCOGEN-NEGATIVE SUBLINE, 5899*
    - MATHEMATICAL MODEL, 5900*
    - PLOIDIES, 5900*
  - CELL MEMBRANE
    - CELLS, CULTURED, 5470
    - HELA CELLS, 5470
  - FIBROBLASTS
    - DNA, 5472
    - RIBOSOMES, 5472
    - RNA, MESSENGER, 5472
    - RNA, RIBOSOMAL, 5472
    - RNA, TRANSFER, 5472
  - LUNG NEOPLASMS
    - T-LYMPHOCYTES, 5755*
  - MELANOMA
    - ANTILYMPHOCYTE SERUM, 5833*
    - DIPHENOL OXIDASES, 5952*
  - NEOPLASMS
    - REVIEW, 5402
  - PITUITARY NEOPLASMS
    - 5ALPHA-ANDROSTAN-3-ONE, 17BETA-HYDROXY-, 5552
    - CORTISOL, 5552
    - CORTISOL ACETATE, 5552
    - ESTRADIOL, 5552
    - ESTROGENS, 5552, 5554
    - IMIDAZOLE-2-THIOL, 1-METHYL-, 5553
    - PROGESTERONE, 5552
    - TESTOSTERONE, 5552
    - THYROXINE, 5554
    - TRIIODOTHYRONINE, 5554
    - URACIL, 6-PROPYL-2-THIO-, 5553

- GUANIDINE, 1-METHYL-3-NITRO-1-NITROSO-
  - CELL TRANSFORMATION, NEOPLASTIC
    - MUTAGENIC ACTIVITY, HAMSTER EMBRYO, 5619*
  - ESTRADIOL
    - DNA REPLICATION, 5666
  - GASTROINTESTINAL NEOPLASMS
    - MUCIN, 5582
    - SODIUM CHLORIDE, 5582
  - HYPOXANTHINE PHOSPHORIBOSYLTRANSFERASE
    - MUTAGENIC ACTIVITY, 5606*, 5607*
  - LYMPHOCYTES
    - HYPOXANTHINE PHOSPHORIBOSYLTRANSFERASE, 5606*
    - THIOGUANINE RESISTANCE, 5606*
  - LYMPHOMA
    - DNA REPAIR, 5581, 5583
    - DNA REPLICATION, 5583
    - DNA, SINGLE STRANDED, 5581
  - PHOSPHOTRANSFERASES, ATP
    - GENETICS, 5638*
    - MUTAGENIC ACTIVITY, OVARY, HAMSTER, 5638*
  - STOMACH NEOPLASMS
    - BASEMENT MEMBRANE, 5803
    - ULTRASTRUCTURAL STUDY, 5803
  - VIRUS, SV40
    - DNA REPLICATION, 5666

- GUANINE
  - DIETHYLAMINE, N-NITROSO-
    - DNA REPAIR, REVIEW, 5496*
  - UREA, ETHYL NITROSO-
    - DNA REPAIR, REVIEW, 5496*
  - UREA, METHYL NITROSO-
    - DNA REPAIR, REVIEW, 5496*

- GUANOSINE CYCLIC 3',5' MONOPHOSPHATE
  - CELL CYCLE KINETICS
    - REVIEW, 5474
  - CELL MEMBRANE
    - REVIEW, 5474
  - EPITHELIAL CELLS
    - CELL DIFFERENTIATION, 5946*, 5974*
  - HEPATOMA
    - BINDING SITES, 5912

- GYNECOLOGIC NEOPLASMS
  - ADENOCARCINOMA

    - 4,4'-STILBENEDIOL, ALPHA,ALPHA'-DIETHYL-, 5495*
  - CONTRACEPTIVES, ORAL
    - HISTOLOGICAL STUDY, REVIEW, 5494*
  - GOITER, ENDEMIC
    - EPIDEMIOLOGY, AFRICA, 5535*
  - INCIDENCE RATES
    - AFRICA, 5535*
  - PERSONALITY
    - EPIDEMIOLOGY, 5992*
  - 4,4'-STILBENEDIOL, ALPHA,ALPHA'-DIETHYL-
    - EPIDEMIOLOGY, REVIEW, 5495*
    - HISTOLOGICAL STUDY, REVIEW, 5495*

HAMARTOMA
  - LIVER NEOPLASMS
    - EPIDEMIOLOGY, 5461
    - REVIEW, 5461

HAPLOIDY
  - CELL TRANSFORMATION, NEOPLASTIC
    - REVIEW, 5457

HEAD AND NECK NEOPLASMS
  - CARCINOMA, EPIDERMOID
    - NUCLEOTIDES, CYCLIC, 5758*
  - LYMPHOCYTES
    - NUCLEOTIDES, CYCLIC, 5758*

HEAVY CHAIN DISEASE
  - INTESTINAL NEOPLASMS
    - PLASMACYTOMA, 5751
  - PLASMACYTOMA
    - CASE REPORT, 5751

HELA CELLS
  - ADENOSINE CYCLIC 3',5' MONOPHOSPHATE
    - CELL CYCLE KINETICS, 5898*
  - BUTANE, 1,2:3,4-DIEPOXY-
    - DNA REPAIR, 5586
  - CELL MEMBRANE
    - GROWTH, 5470
  - CELLS, CULTURED
    - ENZYMATIC ACTIVITY, 5962*
  - ENDONUCLEASES
    - DNA REPAIR, 5586
  - ETHIDIUM BROMIDE
    - RNA, MESSENGER, 5973*
    - RNA REPLICATION, 5973*
  - IMMUNOSUPPRESSION
    - CELL MIXTURES, 5776*
  - INOSINE, NITROBENZYLTHIO-
    - THYMIDINE, 5911
    - URIDINE, 5911
  - KARYOTYPING
    - G-BANDING, 5962*
  - METHANESULFONIC ACID, METHYL ESTER
    - DNA REPAIR, 5586
  - MITOSIS
    - CELL CYCLE KINETICS, 5898*
  - NEOPLASM TRANSPLANTATION
    - CELL MIXTURES, 5776*
  - NUCLEOSIDES
    - METABOLISM, 5911
  - 2-OXETANONE
    - DNA REPAIR, 5586
  - RADIATION, IONIZING
    - CELL MIXTURES, 5776*
  - RNA, RIBOSOMAL
    - RNA, MESSENGER, 5973*
  - THYMIDINE
    - CELL CYCLE KINETICS, 5911
  - TOYOCAMYCIN
    - RNA, MESSENGER, 5973*
    - RNA REPLICATION, 5973*
  - TRANSPLANTATION IMMUNOLOGY
    - CELL MIXTURES, 5776*
  - UREA, METHYL NITROSO-
    - DNA REPAIR, 5586
  - VIRUS, ADENO 2 - SV40 HYBRID
    - VIRAL PROTEINS, 5677
  - VIRUS-LIKE PARTICLES
    - ULTRASTRUCTURAL STUDY, 5716*
  - VIRUS, MASON-PFIZER MONKEY
    - ANTIGENS, VIRAL, 5716*
    - VIRUS-LIKE PARTICLES, 5716*
  - VIRUS, SENDAI
    - CELLS, CULTURED, 5962*
  - VIRUS, VACCINIA
    - DNA REPLICATION, 5679
  - XANTHINE, METHYL-
    - CELL CYCLE KINETICS, 5898*

HEMANGIOBLASTOMA
  - SEE ANGIOSARCOMA

HEMANGIOENDOTHELIOMA
  - ADRENAL GLAND NEOPLASMS
    - CASE REPORT, 5841*
    - HISTOLOGICAL STUDY, 5841*
  - LIVER NEOPLASMS
    - EPIDEMIOLOGY, 5461
    - REVIEW, 5461
  - ORBITAL NEOPLASMS
    - CELL DIFFERENTIATION, 5795
    - ULTRASTRUCTURAL STUDY, 5795

HEMANGIOPERICYTOMA
  - ORBITAL NEOPLASMS
    - CELL DIFFERENTIATION, 5795
    - ULTRASTRUCTURAL STUDY, 5795

HEMATOPOIESIS
  - CARCINOMA, EHRLICH TUMOR
    - EXTRAMEDULLARY TUMOR, 5850*

HEMATOPOIETIC STEM CELLS
  - CELL DIFFERENTIATION
    - CELLS, CULTURED, REVIEW, 5934*
  - LYMPHOKINES
    - CELLS, CULTURED, REVIEW, 5934*

HEMOSTASIS
  - LYMPHOMA
    - CELL TRANSFORMATION, NEOPLASTIC, 5676
    - ONCOGENIC VIRUSES, 5676

HEPATECTOMY
  - CARBAMIC ACID, ETHYL ESTER
    - DNA, 5585

HEPATITIS, INFECTIOUS
  - AUSTRALIA ANTIGEN
    - EPIDEMIOLOGY, SOUTH VIETNAM, 5875
    - FETAL GLOBULINS, 5875
  - FETAL GLOBULINS

    EPIDEMIOLOGY, SOUTH VIETNAM, 5875

HEPATOCARCINOMA
  SEE HEPATOMA

HEPATOMA
  ACETAMIDE, N-FLUOREN-2-YLDI-
    AGE FACTORS, RAT, 5596*
    SEX FACTORS, RAT, 5596*
  ADENOSINE CYCLIC 3',5' MONOPHOSPHATE
    BINDING SITES, 5912
    METABOLISM, REVIEW, 5478
    PHOSPHOPROTEINS, 5913
    PROTEIN KINASE, 5913
  ANILINE, N,N-DIMETHYL-P-PHENYLAZO-
    IMMUNITY, CELLULAR, 5735
  ANTIGENS, NEOPLASM
    IMMUNITY, CELLULAR, 5735
  AUSTRALIA ANTIGEN
    ANTIGEN-ANTIBODY REACTIONS, 5690
    BANTUS, 5690
    EPIDEMIOLOGY, SOUTH VIETNAM, 5875
    FETAL GLOBULINS, 5690, 5875
    TISSUE CULTURE, 5722*
    VIRUS REPLICATION, 5722*
  BARBITURIC ACID, 5-ETHYL-5-PHENYL-
    TRANSFERASES, 5565
  CARBOHYDRATES
    METABOLISM, REVIEW, 5478
  CARCINOEMBRYONIC ANTIGEN
    IMMUNITY, CELLULAR, 5735
  CATALASE
    OXIDOREDUCTASES, 5971*
  CATECHOLAMINES
    ADENYL CYCLASE, 5957*
    RECEPTORS, DRUG, 5957*
  CELL LINE
    CARCINOGENIC POTENTIAL, 5467
    CONTACT INHIBITION, 5467
    ISOLATION AND CHARACTERIZATION, REVIEW, 5467
    KARYOTYPING, 5467
    SURFACE PROPERTIES, 5467
  CELLS, CULTURED
    OXIDOREDUCTASES, 5971*
  CHOLANTHRENE, 3-METHYL-
    TRANSFERASES, 5565
  CONTRACEPTIVES, ORAL
    CARCINOGENIC ACTIVITY, 5555
    EPIDEMIOLOGY, 5605*
  CYCLOHEXIMIDE
    ISOBUTYRIC ACID, ALPHA-AMINO-, 5924
  CYTOCHROME P-450
    ISOLATION AND CHARACTERIZATION, 5601*
  CYTOCHROME REDUCTASES
    ISOLATION AND CHARACTERIZATION, 5601*
  DEXAMETHASONE
    GLYCINE, 5924
    ISOBUTYRIC ACID, ALPHA-AMINO-, 5924
  DIETHYLAMINE, N-NITROSO-
    SULFHYDRYL COMPOUNDS, REVIEW, 5907
  DNA
    METABOLISM, REVIEW, 5478
  ENDOPLASMIC RETICULUM
    NUCLEOTIDES, CYCLIC, 5912
    PHOSPHOPROTEINS, 5913
    PROTEIN KINASE, 5913
  ENZYMATIC ACTIVITY
    CELL SUSPENSION, REVIEW, 5475
  FETAL GLOBULINS
    EPIDEMIOLOGY, SOUTH VIETNAM, 5875
  GLYCINE
    ISOBUTYRIC ACID, ALPHA-AMINO-, 5924
  GUANOSINE CYCLIC 3',5' MONOPHOSPHATE
    BINDING SITES, 5912
  HISTONES
    PROTEIN KINASE, 5913
  INSULIN
    ISOBUTYRIC ACID, ALPHA-AMINO-, 5924
  ISOPROTERENOL
    ADENYL CYCLASE, 5957*
  LIVER NEOPLASMS
    EPIDEMIOLOGY, 5461
    REVIEW, 5461
  MACROPHAGES
    CHEMOTAXIS, INHIBITORY FACTOR, 5763*
  MICROBODIES
    ULTRASTRUCTURAL STUDY, 5971*
  NEOPLASMS, EXPERIMENTAL
    ARTERIAL RESISTANCE, 5477
  PHENETHYLAMINE, N-BENZYL-N,ALPHA-DIMETHYL-
    CYTOCHROME P-450, 5601*
    CYTOCHROME REDUCTASES, 5601*
    HYDROXYLATION, 5601*
    LECITHINS, 5601*
  PRACTOLOL
    ADENYL CYCLASE, 5957*
  PROTEIN KINASE
    ISOLATION AND CHARACTERIZATION, 5995*
  PROTEINS
    CELL SUSPENSION, REVIEW, 5475
    RNA, 6000*
  PURINES
    METABOLISM, REVIEW, 5478
  PYRIMIDINES
    METABOLISM, REVIEW, 5478
  RESERPINE
    CARCINOGENIC ACTIVITY, MOUSE, 5414
  RNA
    ISOLATION AND CHARACTERIZATION, 6000*
  STEROIDS
    TRANSFERASES, 5565
  THORIUM DIOXIDE
    CASE REPORT, 5625
    RETENTION, SPLEEN AND LIVER, 5625
  VIRUS, AVIAN LEUKOSIS
    CARCINOGENIC POTENTIAL, REVIEW, 5511*

2,5-HEXADIENOIC ACID, 3-METHOXY-5-METHYL-4
OXO-
  FIBROSARCOMA
    ISOLATION AND CHARACTERIZATION, 5422
  SARCOMA
    ISOLATION AND CHARACTERIZATION, 5422

* INDICATES A PLAIN CITATION WITHOUT ACCOMPANYING ABSTRACT

HEXOKINASE
- VIRUS, MURINE SARCOMA
  - CELL TRANSFORMATION, NEOPLASTIC, 5662
  - CONTACT INHIBITION, 5662

HEXOSES
- VIRUS, ROUS SARCOMA
  - METABOLISM, 5645
  - TEMPERATURE SENSITIVE MUTANTS, 5645

ISTIOCYTES
- HODGKIN'S DISEASE
  - ULTRASTRUCTURAL STUDY, 5859*

ISTOCOMPATIBILITY ANTIGENS
- CARCINOEMBRYONIC ANTIGEN
  - ANTIGENIC DETERMINANTS, REVIEW, 5448
- CELL TRANSFORMATION, NEOPLASTIC
  - ANTIGENIC DETERMINANTS, REVIEW, 5448
- COMPLEMENT
  - IMMUNE RESPONSE, 5767*
- FETAL GLOBULINS
  - ANTIGENIC DETERMINANTS, REVIEW, 5448
- GENETICS
  - IMMUNE RESPONSE, REVIEW, 5447
- GONADOTROPINS, CHORIONIC
  - ANTIGENIC DETERMINANTS, REVIEW, 5448
- GRAFT VS HOST REACTION
  - REVIEW, 5742
- ISOANTIGENS, REVIEW
  - TISSUE DISTRIBUTION, REVIEW, 5528*
- LEUKEMIA
  - HYBRID CELLS, 5760*
  - IMMUNE SERUMS, 5760*
- B-LYMPHOCYTES
  - ANTIGEN-ANTIBODY REACTIONS, 5767*
  - COMPLEMENT, 5767*
  - IMMUNOGLOBULINS, FC, 5767*
  - ISOANTIGENS, REVIEW, 5528*
- T-LYMPHOCYTES
  - ISOANTIGENS, REVIEW, 5528*
- LYMPHOMA
  - ANTIBODIES, HETEROTYPIC, 5724
  - DEREPRESSION, 5724
- LYMPHOSARCOMA
  - ANTIBODIES, HETEROTYPIC, 5724
  - DEREPRESSION, 5724
- MACROPHAGES
  - ISOANTIGENS, REVIEW, 5528*
- NEOPLASMS, EXPERIMENTAL
  - HYBRID CELLS, 5450, 5764*
- SPERMATOZOA
  - ISOANTIGENS, REVIEW, 5528*
- TERATOID TUMOR
  - ISOANTIGENS, REVIEW, 5528*

STONES
- HEPATOMA
  - PROTEIN KINASE, 5913

DGKIN'S DISEASE
- AMINO ACID NAPHTHYLAMIDASES
  - ISOLATION AND CHARACTERIZATION, 5597*
- ANTIBODIES, VIRAL
  - DIAGNOSIS AND PROGNOSIS, 5747
  - IMMUNITY, CELLULAR, 5747
- ANTIGENS, VIRAL
  - DIAGNOSIS AND PROGNOSIS, 5747
  - IMMUNITY, CELLULAR, 5747
- CELL DIFFERENTIATION
  - ULTRASTRUCTURAL STUDY, 5726, 5859*
- GASTROINTESTINAL NEOPLASMS
  - HISTOLOGICAL STUDY, 5812*
- GRAFT VS HOST REACTION
  - REVIEW, 5742
- HISTIOCYTES
  - ULTRASTRUCTURAL STUDY, 5859*
- HYPERSENSITIVITY, DELAYED
  - DIAGNOSIS AND PROGNOSIS, 5747
  - IMMUNITY, CELLULAR, 5747
- IMMUNOGLOBULINS, SURFACE
  - ANTIGEN-ANTIBODY REACTIONS, 5726
  - IGG, 5726
- LYMPH NODES
  - DNA REPLICATION, 5859*
- B-LYMPHOCYTES
  - CLINICAL STAGE, 5728
  - LYMPHOCYTE DEPLETION, 5728
- T-LYMPHOCYTES
  - CLINICAL STAGE, 5728
  - DIAGNOSIS AND PROGNOSIS, 5747
  - IMMUNITY, CELLULAR, 5747
  - LYMPHOCYTE DEPLETION, 5728
- VIRUS, EPSTEIN-BARR
  - ANTIGENS, VIRAL, 5747
  - IMMUNITY, CELLULAR, 5747

HORMONES
- VIRUS, MURINE MAMMARY TUMOR
  - SECRETION, 5781
  - VIRUS REPLICATION, 5781

HYBRID CELLS
- L CELLS
  - CARCINOGENIC POTENTIAL, MOUSE, 5964*
- LEUKEMIA
  - HISTOCOMPATIBILITY ANTIGENS, 5760*
  - IMMUNE SERUMS, 5760*
- MULTIPLE MYELOMA
  - IMMUNOGLOBULINS, LIGHT CHAIN, 5727
- NEOPLASMS, EXPERIMENTAL
  - ANTIGENIC DETERMINANTS, 5450, 5764*
  - CHROMOSOMES, 5450
  - HISTOCOMPATIBILITY ANTIGENS, 5450, 5764*
  - TRANSPLANTATION IMMUNOLOGY, 5764*
- VIRUS, RAUSCHER MURINE LEUKEMIA
  - VIRUS REPLICATION, 5704*

HYDANTOIN, 5,5-DIPHENYL-
- GRAFT VS HOST REACTION
  - REVIEW, 5742

HYDATIDIFORM MOLE
- THYROTROPIN
  - ISOLATION AND CHARACTERIZATION, REVIEW, 5451

HYDRAZINE, 1,2-DIMETHYL-

- COLONIC NEOPLASMS
  - NUCLEOPROTEINS, 5990*

- HYDROLASES
  - ANTI-INFLAMMATORY AGENTS
    - STAPHYLOCOCCUS, 5761*
  - ELECTROLYTES
    - STAPHYLOCOCCUS, 5761*
  - LEUKOCYTES
    - STAPHYLOCOCCUS, 5761*
    - STREPTOCOCCUS FAECALIS, 5761*

- HYDROXYACETYLAMINOFLUORENE
  - SEE ACETOHYDROXAMIC ACID, N-FLUOREN-2-YL-

- HYDROXYLASES
  - BARBITURIC ACID, 5-ETHYL-5-PHENYL-
    - BUTYRAMIDE, N-FLUOREN-2-YL-, 5571
  - 5,6-BENZOFLAVONE
    - GENETICS, MOUSE, 5571
  - 7,8-BENZOFLAVONE
    - GENETICS, MOUSE, 5571
  - CHOLANTHRENE, 3-METHYL-
    - GENETICS, MOUSE, 5571
  - DIBENZO-P-DIOXIN, 2,3,7,8-TETRACHLORO-
    - GENETICS, MOUSE, 5571
  - 1-PROPANONE, 2-METHYL-1,2-DI-3-PYRIDYL-, TARTRATE
    - GENETICS, MOUSE, 5571

- HYPERPARATHYROIDISM
  - THYROID NEOPLASMS
    - CARCINOMA, PAPILLARY, 5844*
    - CASE REPORT, 5844*

- HYPERPLASIA
  - ADRENAL GLAND NEOPLASMS
    - GONADECTOMY, MOUSE, 5781
  - LIVER NEOPLASMS
    - ACETAMIDE, N-FLUOREN-2-YL-, 5598*

- HYPERSENSITIVITY, DELAYED
  - HODGKIN'S DISEASE
    - DIAGNOSIS AND PROGNOSIS, 5747
    - IMMUNITY, CELLULAR, 5747
  - KIDNEY NEOPLASMS
    - NEOPLASM REGRESSION, SPONTANEOUS, 5849*
  - MELANOMA
    - ANTIGENS, NEOPLASM, 5723
  - OVARIAN NEOPLASMS
    - IMMUNITY, CELLULAR, 5737
  - SARCOMA
    - IMMUNE RESPONSE, 5774*
    - NEOPLASM METASTASIS, 5774*

- HYPERTENSION
  - ACETAMIDE, N-(ACETYLOXY)-N-9H-FLUOREN-2-YL-
    - CHROMOSOME ABERRATIONS, 5595*
    - DNA REPAIR, 5595*
  - BENZ(A)ANTHRACENE, 7,12-DIMETHYL-
    - DNA, 5595*

- HYPERTHYROIDISM
  - CARCINOID TUMOR
    - CASE REPORT, 5863*
  - GONADOTROPINS, CHORIONIC
    - ETIOLOGY, REVIEW, 5451
  - INTESTINAL NEOPLASMS
    - CASE REPORT, 5863*
  - THYROTROPIN
    - ETIOLOGY, REVIEW, 5451

- HYPOTHYROIDISM
  - IODINE RADIOISOTOPES
    - CHROMOSOME ABERRATIONS, 5631*

- HYPOXANTHINE PHOSPHORIBOSYLTRANSFERASE
  - GUANIDINE, 1-METHYL-3-NITRO-1-NITROS
    - LYMPHOCYTES, 5606*
    - MUTAGENIC ACTIVITY, 5606*, 5607*
  - METHANESULFONIC ACID, ETHYL ESTER
    - MUTAGENIC ACTIVITY, 5607*
  - METHANESULFONIC ACID, METHYL ESTER
    - MUTAGENIC ACTIVITY, 5607*
  - ULTRAVIOLET RAYS
    - MUTAGENIC ACTIVITY, 5636*
    - THIOGUANINE RESISTANCE, 5636*

- IGE
  - CELL MEMBRANE
    - CELL DIFFERENTIATION, 5507*

- IGG
  - CECAL NEOPLASMS
    - AUTOANTIBODIES, 5810*
  - HODGKIN'S DISEASE
    - IMMUNOGLOBULINS, SURFACE, 5726
  - SARCOMA, RETICULUM CELL
    - IMMUNOGLOBULINS, SURFACE, 5726

- IMIDAZOLE, 1,2-DIMETHYL-5-NITRO-
  - IMIDAZOLE-1-ETHANOL, 2-METHYL-5-NITR
    - MUTAGENIC ACTIVITY, 5590

- IMIDAZOLE, 1,3-DIMETHYL-5-NITRO-
  - IMIDAZOLE-1-ETHANOL, 2-METHYL-5-NITR
    - MUTAGENIC ACTIVITY, 5590

- IMIDAZOLE-1-ETHANOL, 2-METHYL-5-NITRO-
  - IMIDAZOLE, 1,2-DIMETHYL-5-NITRO-
    - MUTAGENIC ACTIVITY, 5590
  - IMIDAZOLE, 1,3-DIMETHYL-5-NITRO-
    - MUTAGENIC ACTIVITY, 5590
  - IMIDAZOLE, 1-METHYL-5-NITRO-
    - MUTAGENIC ACTIVITY, 5590
  - IMIDAZOLE, 2-METHYL-4-NITRO-
    - MUTAGENIC ACTIVITY, 5590
  - IMIDAZOLE, 4-NITRO-
    - MUTAGENIC ACTIVITY, 5590
  - IMIDAZOLE, 1,2,3-TRIMETHYL-5-NITRO-
    - MUTAGENIC ACTIVITY, 5590
  - STRUCTURE-ACTIVITY RELATIONSHIP
    - MUTAGENIC ACTIVITY, 5590

- IMIDAZOLE, 1-METHYL-5-NITRO-
  - IMIDAZOLE-1-ETHANOL, 2-METHYL-5-NITR
    - MUTAGENIC ACTIVITY, 5590

- IMIDAZOLE, 2-METHYL-4-NITRO-
  - IMIDAZOLE-1-ETHANOL, 2-METHYL-5-NITR
    - MUTAGENIC ACTIVITY, 5590

- IMIDAZOLE, 4-NITRO-
  - IMIDAZOLE-1-ETHANOL, 2-METHYL-5-NITR
    - MUTAGENIC ACTIVITY, 5590

IDAZOLE, 4-(P-BROMOPHENYL)-
  ETHYLENE, CHLORO-
    METABOLISM, RAT, 5592

IDAZOLE-2-THIOL, 1-METHYL-
  PITUITARY NEOPLASMS
    ESTRADIOL, 5553
    GROWTH, 5553

IDAZOLE, 1,2,3-TRIMETHYL-5-NITRO-
  IMIDAZOLE-1-ETHANOL, 2-METHYL-5-NITRO-
    MUTAGENIC ACTIVITY, 5590

MIDAZOLIDINONE, 1-(5-NITRO-2-THIAZOLYL)-
  BLADDER NEOPLASMS
    ULTRASTRUCTURAL STUDY, MOUSE, 5591

UNE COMPLEX DISEASE
  GRAFT VS HOST REACTION
    REVIEW, 5742

UNE SERUMS
  ANTIGENS, NEOPLASM
    IMMUNITY, CELLULAR, REVIEW, 5446
  BENZO(A)PYRENE
    ACTIN, 5618*
    CELL TRANSFORMATION, NEOPLASTIC, 5618*
  CHOLANTHRENE, 3-METHYL-
    ACTIN, 5618*
    CELL TRANSFORMATION, NEOPLASTIC, 5618*
  CONCANAVALIN A
    CELL MEMBRANE, 5909
  CYTOSINE, 1-BETA-D-ARABINOFURANOSYL-
    ACTIN, 5618*
    CELL TRANSFORMATION, NEOPLASTIC, 5618*
  LEUKEMIA
    ANTIGEN-ANTIBODY COMPLEX, 5765*
    ANTIGENS, NEOPLASM, 5760*
    HISTOCOMPATIBILITY ANTIGENS, 5760*
    HYBRID CELLS, 5760*
    MACROPHAGES, 5738
  LEUKEMIA, MYELOCYTIC
    ANTIGENS, NEOPLASM, 5740
  SARCOMA, MAST CELL
    MACROPHAGES, 5738
  VIRUS, HERPES SIMPLEX 1
    ANTIBODY FORMATION, 5693
  VIRUS, HERPES SIMPLEX 2
    ANTIBODY FORMATION, 5693
  VIRUS, MURINE LEUKEMIA
    ANTIGEN-ANTIBODY REACTIONS, 5703*
    VIRUS REPLICATION, 5703*
  VIRUS, PARAMYXO
    CONTAMINATION, HUMAN CELL CULTURES, 5680

UNITY, CELLULAR
  BRAIN NEOPLASMS
    ANTIGENS, NEOPLASM, 5733
  CARCINOMA
    LYMPHOCYTE TRANSFORMATION, 5736
  CARCINOMA, TRANSITIONAL CELL
    GONADOTROPINS, CHORIONIC, 5732
  CERVIX NEOPLASMS
    RADIATION EFFECTS, 5769*
  HEPATOMA
    ANILINE, N,N-DIMETHYL-P-PHENYLAZO-, 5735
    ANTIGENS, NEOPLASM, 5735
    CARCINOEMBRYONIC ANTIGEN, 5735
  HODGKIN'S DISEASE
    ANTIBODIES, VIRAL, 5747
    ANTIGENS, VIRAL, 5747
    HYPERSENSITIVITY, DELAYED, 5747
    T-LYMPHOCYTES, 5747
    VIRUS, EPSTEIN-BARR, 5747
  LEUKEMIA
    LYMPHOCYTES, 5738
    MACROPHAGES, 5738
  LUNG NEOPLASMS
    T-LYMPHOCYTES, 5755*
  LYMPHOMA
    ANTIBODY FORMATION, 5770*
    VIRUS, GROSS MURINE LEUKEMIA, 5762*
    VIRUS, MOLONEY MURINE LEUKEMIA, 5749
  MAMMARY NEOPLASMS, EXPERIMENTAL
    ANTIGENS, NEOPLASM, 5739
  MELANOMA
    ANTIGENS, NEOPLASM, 5734
    CELL MEMBRANE, 5744
    MIGRATION INHIBITORY FACTOR, 5734
  OVARIAN NEOPLASMS
    HYPERSENSITIVITY, DELAYED, 5737
    PLANT AGGLUTININS, 5737
  SARCOMA
    ANTIGENS, NEOPLASM, 5735
    CARCINOEMBRYONIC ANTIGEN, 5735
    CHOLANTHRENE, 3-METHYL-, 5735
  SARCOMA, MAST CELL
    LYMPHOCYTES, 5738
    MACROPHAGES, 5738
  VIRUS, AVIAN LEUKOSIS
    VIRUS REPLICATION, 5701*
  VIRUS, FRIEND MURINE LEUKEMIA
    ANTIGENIC DETERMINANTS, 5756*
    LYMPHOCYTES, 5653
    T-LYMPHOCYTES, 5756*
    RADIATION, IONIZING, 5756*
  VIRUS, LACTATE DEHYDROGENASE
    T-LYMPHOCYTES, 5749
  VIRUS, MOLONEY MURINE LEUKEMIA
    T-LYMPHOCYTES, 5749
    VIRUS, CHORIOMENINGITIS, 5749

IMMUNITY, PASSIVE
  LEUKEMIA L1210
    DRUG THERAPY, 5933*
  VIRUS, FRIEND MURINE LEUKEMIA
    LYMPHOCYTE CULTURE TEST, MIXED, 5756*
    T-LYMPHOCYTES, 5756*

IMMUNOGLOBULINS
  SEE ALSO IGA/IGD/IGE/IGM
  CERVIX NEOPLASMS
    RADIATION EFFECTS, 5769*
  SARCOMA
    CELLS, CULTURED, 5746

IMMUNOGLOBULINS, FC
  LEUKEMIA, LYMPHOCYTIC
    B-LYMPHOCYTES, 5731

    - T-LYMPHOCYTES, 5731
  - B-LYMPHOCYTES
    - CELL MEMBRANE, 5767*
    - HISTOCOMPATIBILITY ANTIGENS, 5767*
    - ISOANTIGENS, 5767*

- IMMUNOGLOBULINS, LIGHT CHAIN
  - MULTIPLE MYELOMA
    - CYCLOHEXIMIDE, 5727
    - HYBRID CELLS, 5727
    - PUROMYCIN, 5727

- IMMUNOGLOBULINS, SURFACE
  - HODGKIN'S DISEASE
    - ANTIGEN-ANTIBODY REACTIONS, 5726
    - IGG, 5726
  - LYMPHOMA
    - SJOGREN'S SYNDROME, 5815*
  - SARCOMA, RETICULUM CELL
    - ANTIGEN-ANTIBODY REACTIONS, 5726
    - IGG, 5726

- IMMUNOLOGIC DEFICIENCY SYNDROMES
  - LYMPHOMA
    - CASE REPORT, CHRONIC LYMPHADENOPATHY, 5828*
    - REVIEW, 5452

- IMMUNOSUPPRESSION
  - BLADDER NEOPLASMS
    - LYMPHOCYTES, 5729
    - MACROPHAGES, 5729
  - BREAST NEOPLASMS
    - TRANSPLANTATION, HETEROLOGOUS, 5768*
  - CERVIX NEOPLASMS
    - EPIDEMIOLOGY, REVIEW, 5881
    - RADIATION EFFECTS, 5769*
  - GASTROINTESTINAL NEOPLASMS
    - TRANSPLANTATION, HETEROLOGOUS, 5768*
  - HELA CELLS
    - CELL MIXTURES, 5776*
  - LYMPHATIC NEOPLASMS
    - EPIDEMIOLOGY, REVIEW, 5881
  - LYMPHOMA
    - REVIEW, 5452
  - MAMMARY NEOPLASMS, EXPERIMENTAL
    - LYMPHOCYTES, 5729
    - MACROPHAGES, 5729
  - PROSTATIC NEOPLASMS
    - NEOPLASM TRANSPLANTATION, 5963*
  - SKIN NEOPLASMS
    - EPIDEMIOLOGY, REVIEW, 5881
  - UROGENITAL NEOPLASMS
    - TRANSPLANTATION, HETEROLOGOUS, 5768*
  - VIRUS, FRIEND MURINE LEUKEMIA
    - REVIEW, 5452
  - VIRUS, SV40
    - CELL MIXTURES, 5776*
    - CELL TRANSFORMATION, NEOPLASTIC, 5671

- IMMUNOTHERAPY
  - LEUKEMIA, LYMPHOBLASTIC
    - B-LYMPHOCYTES, 5947*
  - LEUKEMIA, MYELOBLASTIC
    - LYMPHOCYTE TRANSFORMATION, 5759*

- INFECTIOUS MONONUCLEOSIS
  - GRAFT VS HOST REACTION
    - REVIEW, 5742
  - VIRUS, EPSTEIN-BARR
    - ANTIGEN-ANTIBODY REACTIONS, REVIEW 5441
    - CARCINOGENIC POTENTIAL, REVIEW, 5433

- INOSINE, NITROBENZYLTHIO-
  - HELA CELLS
    - THYMIDINE, 5911
    - URIDINE, 5911

- INSULIN
  - BINDING SITES
    - FIBROBLASTS, CHICK EMBRYO, 5948*
  - BREAST
    - DNA REPLICATION, 5560
    - ULTRASTRUCTURAL STUDY, 5560
  - CELL TRANSFORMATION, NEOPLASTIC
    - FIBROBLASTS, 5926
    - RECEPTORS, HORMONE, 5926
  - ENDOMETRIUM
    - ULTRASTRUCTURAL STUDY, RABBIT, 5953*
  - GLYCOPROTEINS
    - ENDOMETRIUM, RABBIT, 5953*
  - HEPATOMA
    - ISOBUTYRIC ACID, ALPHA-AMINO-, 5924
  - MAMMARY NEOPLASMS, EXPERIMENTAL
    - PRECANCEROUS CONDITIONS, 5561
  - TRYPSIN
    - RECEPTORS, HORMONE, 5948*

- INTERFERON
  - VIRUS, FRIEND MURINE LEUKEMIA
    - STATOLON, 5653

- INTESTINAL NEOPLASMS
  - CARCINOID TUMOR
    - DUODENAL ULCER, 5863*
    - REVIEW, 5458
  - CARCINOMA
    - FIBRINOLYSIS, 5800
  - DIET
    - EPIDEMIOLOGY, REVIEW, 5538*
  - DIETARY FATS
    - EPIDEMIOLOGY, REVIEW, 5539*
  - DIETARY PROTEINS
    - EPIDEMIOLOGY, REVIEW, 5539*
  - HYPERTHYROIDISM
    - CASE REPORT, 5863*
  - NEOPLASM CIRCULATING CELLS
    - FIBRINOLYSIS, 5800
  - PLASMACYTOMA
    - CASE REPORT, 5751
    - HEAVY CHAIN DISEASE, 5751
    - IMMUNOPEROXIDASE STUDY, 5751
  - TRANSPLANTATION, HETEROLOGOUS
    - CELL DIFFERENTIATION, 5970*
    - LACTATE DEHYDROGENASE, 5970*
  - URACIL, 5-FLUORO-
    - TREATMENT AND PROGNOSIS, REVIEW, 5538*

- INTESTINES
  - AMINO ACID NAPHTHYLAMIDASES

    - ISOLATION AND CHARACTERIZATION, 5597*
  - CHALONES
    - DNA REPLICATION, 5968*
    - ISOLATION, RABBIT, 5968*

IODINE RADIOISOTOPES
  - CHROMOSOME ABERRATIONS
    - HYPOTHYROIDISM, 5631*

IODOPROTEINS
  - LEUKEMIA
    - T-LYMPHOCYTES, 5910

ISOANTIGENS
  - BREAST NEOPLASMS
    - ADENOCARCINOMA, 5449
    - CARCINOMA, DUCTAL, 5449
    - CARCINOMA IN SITU, 5449
    - ISOLATION AND CHARACTERIZATION, REVIEW, 5449
  - HISTOCOMPATIBILITY ANTIGENS
    - TISSUE DISTRIBUTION, REVIEW, 5528*
  - B-LYMPHOCYTES
    - ANTIGEN-ANTIBODY REACTIONS, 5767*
    - COMPLEMENT, 5767*
    - IMMUNOGLOBULINS, FC, 5767*

SOBUTYRIC ACID, ALPHA-AMINO-
  - CELL MEMBRANE
    - CELL TRANSFORMATION, NEOPLASTIC, 5674
  - ENDOPLASMIC RETICULUM
    - CELL TRANSFORMATION, NEOPLASTIC, 5674
  - HEPATOMA
    - CYCLOHEXIMIDE, 5924
    - DEXAMETHASONE, 5924
    - GLYCINE, 5924
    - INSULIN, 5924
  - SODIUM CHLORIDE
    - CELL TRANSFORMATION, NEOPLASTIC, 5674
  - VIRUS, SV40
    - CELL TRANSFORMATION, NEOPLASTIC, 5673, 5674

SOPROTERENOL
  - HEPATOMA
    - ADENYL CYCLASE, 5957*

SOQUINOLINE, 6,7-DIMETHOXY-1-VERATRYL-
  - NEUROBLASTOMA
    - CARBOXY-LYASES, 5986*
  - PLASMINOGEN
    - OVARY, HAMSTER, 5918

ARYOTYPING
  - CELLS, CULTURED
    - G-BANDING, 5962*
  - HELA CELLS
    - G-BANDING, 5962*
  - HEPATOMA
    - CELL LINE, 5467
  - L CELLS
    - CELL FUSION, 5964*
  - LEUKEMIA, MYELOCYTIC
    - BONE MARROW CELLS, 5807
    - LYMPHOID TISSUE, 5807
  - LUNG NEOPLASMS
    - FIBROBLASTS, 5905
  - MELANOMA
    - CELL LINE, 5834*
    - CHROMOSOME ABERRATIONS, 5793

KERATITIS
  - ULTRAVIOLET RAYS
    - DOSE-RESPONSE STUDY, REVIEW, 5501*

KETONES
  - VIRUS, SV40
    - ANTIGENS, VIRAL, 5667

KIDNEY NEOPLASMS
  - ADENOCARCINOMA
    - CASE REPORT, CHILD, 5851*
    - CITRININ, 5578
    - NEOPLASM REGRESSION, SPONTANEOUS, 5849*
  - CHILD
    - TREATMENT AND PROGNOSIS, 5851*
  - CITRININ
    - CARCINOGENIC POTENTIAL, 5578
  - DIMETHYLAMINE, N-NITROSO-
    - CITRININ, 5578
  - HYPERSENSITIVITY, DELAYED
    - NEOPLASM REGRESSION, SPONTANEOUS, 5849*
  - NEOPLASM METASTASIS
    - NEOPLASM REGRESSION, SPONTANEOUS, 5849*
  - NEOPLASM REGRESSION, SPONTANEOUS
    - CASE REPORT, 5849*
  - 4,4'-STILBENEDIOL, ALPHA,ALPHA'-DIETHYL-
    - CELL CYCLE KINETICS, 5556
  - SUCCINIMIDE, N-(3,5-DICHLOROPHENYL)-
    - CITRININ, 5578
  - TERATOID TUMOR
    - CITRININ, 5578
  - VIRUS, AVIAN LEUKOSIS
    - CARCINOGENIC POTENTIAL, REVIEW, 5511*

L CELLS
  - CELL FUSION
    - CARCINOGENIC POTENTIAL, MOUSE, 5964*
    - KARYOTYPING, 5964*
  - HYBRID CELLS
    - CARCINOGENIC POTENTIAL, MOUSE, 5964*
  - RNA
    - METHYLATED SEQUENCES, 5976*
  - RNA, MESSENGER
    - METHYLATED SEQUENCES, 5976*

LACTATE DEHYDROGENASE
  - INTESTINAL NEOPLASMS
    - TRANSPLANTATION, HETEROLOGOUS, 5970*

LACTATION DISORDERS
  - PITUITARY NEOPLASMS
    - ADENOMA, 5842*

LARYNGEAL NEOPLASMS
  - AGE FACTORS

  - EPIDEMIOLOGY, OKLAHOMA, 5874
- CHOLANTHRENE, 3-METHYL-
  - ARYL HYDROCARBON HYDROXYLASES, 5600*
- ETHNIC GROUPS
  - EPIDEMIOLOGY, OKLAHOMA, 5874
- LYMPHOCYTES
  - ARYL HYDROCARBON HYDROXYLASES, 5600*
- METAPLASIA
  - HISTOLOGICAL STUDY, 5854*
- PRECANCEROUS CONDITIONS
  - HISTOLOGICAL STUDY, 5854*
- SEX FACTORS
  - EPIDEMIOLOGY, OKLAHOMA, 5874
- SMOKING
  - ARYL HYDROCARBON HYDROXYLASES, 5600*
- VIRUS, PAPILLOMA
  - EPIDEMIOLOGY, 5681

LEAD
- ENVIRONMENTAL HAZARD
  - CARCINOGENIC POTENTIAL, REVIEW, 5489*

LECITHINS
- HEPATOMA
  - PHENETHYLAMINE, N-BENZYL-N,ALPHA-DIMETHYL-, 5601*

LEIOMYOSARCOMA
- STOMACH NEOPLASMS
  - UREA, 3-ACETYL-1-METHYL-1-NITROSO-, 5587

LEUCINE
- VIRUS, ROUS SARCOMA
  - CELL TRANSFORMATION, NEOPLASTIC, 5645

LEUKEMIA
- ACTINOMYCIN D
  - ANTIGEN-ANTIBODY COMPLEX, 5765*
- ALKALINE PHOSPHATASE
  - DNA REPLICATION, 5994*
- ANTIGEN-ANTIBODY COMPLEX
  - DRUGS, ANTIMITOTIC, 5765*
- ANTIGENS, NEOPLASM
  - IMMUNE SERUMS, 5760*
- ATOMIC WARFARE
  - DOSE-RESPONSE STUDY, REVIEW, 5431
- BONE MARROW CELLS
  - CELL DIFFERENTIATION, 5902
  - ENZYMATIC ACTIVITY, 5902
- CELL ADHESION
  - CELL MIXTURES, 5966*
- CELL DIFFERENTIATION
  - CELL MEMBRANE, REVIEW, 5523*
- CELL MEMBRANE
  - ANTIGEN-ANTIBODY COMPLEX, 5765*
  - ANTIGENS, 5760*
- CHILD
  - CELL DIFFERENTIATION, 5902
- DNA REPLICATION
  - CELL CYCLE KINETICS, 5903
- EPIDEMIOLOGY, CHILD
  - REVIEW, 5463
- GLYCOPROTEINS
  - ISOLATION AND CHARACTERIZATION, 5910
- HISTOCOMPATIBILITY ANTIGENS
  - HYBRID CELLS, 5760*
  - IMMUNE SERUMS, 5760*
- IMMUNE SERUMS
  - ANTIGEN-ANTIBODY COMPLEX, 5765*
  - HYBRID CELLS, 5760*
- LYMPHOCYTES
  - IMMUNITY, CELLULAR, 5738
- T-LYMPHOCYTES
  - GLYCOPROTEINS, 5910
  - IODOPROTEINS, 5910
  - LYMPHOBLASTOGENESIS INHIBITION FACTOR, 5754*
- MACROPHAGES
  - IMMUNE SERUMS, 5738
  - IMMUNITY, CELLULAR, 5738
- MELANOMA
  - ANTIGENIC DETERMINANTS, 5717*
- MYELOID METAPLASIA
  - EPIDEMIOLOGY, REVIEW, 5454
- ONCOGENIC VIRUSES
  - RADIATION EFFECTS, REVIEW, 5497*
- POLYCYTHEMIA VERA
  - EPIDEMIOLOGY, REVIEW, 5454
- PURINE-6-THIOL
  - CHROMOSOME ABERRATIONS, 5805
  - DNA REPLICATION, 5805
- RADIATION, IONIZING
  - CARCINOGENIC POTENTIAL, REVIEW, 5497*
  - DOSE-RESPONSE STUDY, REVIEW, 5431
  - REVIEW, 5429
  - TRANSPLACENTAL CARCINOGENESIS, REVIEW, 5431
- RETICULOCYTES
  - CELL ADHESION, 5966*
- REVERSE TRANSCRIPTASE
  - ANTIBODY SPECIFICITY, 5717*
  - ISOLATION AND CHARACTERIZATION, 5717*
  - ULTRASTRUCTURAL STUDY, 5717*
- RNA, VIRAL
  - ISOLATION AND CHARACTERIZATION, 5717*
- UREA, HYDROXY-
  - CELL DIVISION, 5903
  - DNA REPLICATION, 5903
  - LEUKOCYTE COUNT, 5903
- VIRUS, HERPES SAIMIRI
  - WHITE RABBIT, 5697

LEUKEMIA, ACUTE LYMPHOCYTIC
- SEE LEUKEMIA, LYMPHOBLASTIC

LEUKEMIA, HAIRY CELL
- LYMPHOCYTES
  - ACID PHOSPHATASE, 5804
- LYSOSOMES
  - ACID PHOSPHATASE, 5917
- MICROSOMES
  - ACID PHOSPHATASE, 5917
- SPLEEN
  - ACID PHOSPHATASE, 5917
- TARTARIC ACID
  - ACID PHOSPHATASE, 5804

LEUKEMIA L1210

- AMINOPTERIN
  - OXIDOREDUCTASES, 5980*
  - TRANSFERASES, 5981*
- ANTINEOPLASTIC AGENTS
  - TRANSFERASES, 5981*
- CARBOHYDRATES
  - IMMUNE RESPONSE, 5933*
- CELL TRANSFORMATION, NEOPLASTIC
  - ACTINOMYCIN D-RESISTANCE, 5712*
- CONCANAVALIN A
  - IMMUNE RESPONSE, 5933*
- DRUG THERAPY
  - IMMUNITY, PASSIVE, 5933*
- METHOTREXATE
  - OXIDOREDUCTASES, 5980*
  - TRANSFERASES, 5981*
- METHOTREXATE, DICHLORO-
  - OXIDOREDUCTASES, 5980*
- NEURAMINIDASE
  - IMMUNE RESPONSE, 5933*
- OXIDOREDUCTASES
  - INHIBITION KINETICS, 5980*
- SERINE HYDROXYMETHYLTRANSFERASE
  - ENZYMATIC ACTIVITY, PIG, MOUSE, 5920
- TETRAHYDROFOLATES
  - TRANSFERASES, 5981*
- VIRUS-LIKE PARTICLES
  - ACTINOMYCIN D-RESISTANCE, 5712*
  - ULTRASTRUCTURAL STUDY, 5712*

UKEMIA, LYMPHOBLASTIC
- CHROMOSOME ABERRATIONS
  - DIAGNOSIS AND PROGNOSIS, 5527*
- DEOXYRIBONUCLEASE
  - ISOLATION AND CHARACTERIZATION, 5983*
- DNA REPLICATION
  - LYMPHOCYTE TRANSFORMATION, 5884
- GENETICS
  - EPIDEMIOLOGY, CHILD, 5882
- GLYCOPROTEINS
  - CELL MEMBRANE, 5947*
- LYMPHOCYTE TRANSFORMATION
  - CELL CYCLE KINETICS, 5884
- LYMPHOCYTES
  - DEOXYRIBONUCLEASE, 5983*
- B-LYMPHOCYTES
  - GLUTAMYL TRANSPEPTIDASE, 5984*
  - IMMUNOTHERAPY, 5947*
- T-LYMPHOCYTES
  - GLUTAMYL TRANSPEPTIDASE, 5984*
- NUCLEOTIDES
  - RNA, TRANSFER, 5989*
- PLANT AGGLUTININS
  - LYMPHOCYTE TRANSFORMATION, 5884
- PRECANCEROUS CONDITIONS
  - EPIDEMIOLOGY, ADULT, 5883
- TETRAHYDROFOLATE DEHYDROGENASE
  - HISTOLOGICAL STUDY, 5982*
- VIRUS, EPSTEIN-BARR
  - DNA, VIRAL, REVIEW, 5689

UKEMIA, LYMPHOCYTIC
- CHROMOSOME ABERRATIONS
  - DIAGNOSIS AND PROGNOSIS, 5527*
- DIBUTYRYL CYCLIC AMP
  - DNA REPLICATION, 5730
- LEUKOCYTES
  - RNA POLYMERASE, 5921
- LYMPHOCYTES
  - CLASSIFICATION, 5752*
- B-LYMPHOCYTES
  - IMMUNOGLOBULINS, FC, 5731
  - ULTRASTRUCTURAL STUDY, 5731
- T-LYMPHOCYTES
  - IMMUNOGLOBULINS, FC, 5731
  - ULTRASTRUCTURAL STUDY, 5731
- PRECANCEROUS CONDITIONS
  - EPIDEMIOLOGY, ADULT, 5883
- SODIUM FLUORIDE
  - ADENOSINE CYCLIC 3',5' MONOPHOSPHATE, 5730
- THEOPHYLLINE
  - ADENOSINE CYCLIC 3',5' MONOPHOSPHATE, 5730

LEUKEMIA, MONOCYTIC
- LYMPHOCYTES
  - CLASSIFICATION, 5752*

LEUKEMIA, MYELOBLASTIC
- ANTIGENS, NEOPLASM
  - LYMPHOCYTE TRANSFORMATION, 5759*
- CHROMOSOME ABERRATIONS
  - DIAGNOSIS AND PROGNOSIS, 5527*
- DNA REPLICATION
  - LYMPHOCYTE TRANSFORMATION, 5884
- GENETICS
  - EPIDEMIOLOGY, CHILD, 5882
- IMMUNOTHERAPY
  - LYMPHOCYTE TRANSFORMATION, 5759*
- LEUKEMIA, MYELOCYTIC
  - ANTIBODY SPECIFICITY, 5740
  - ANTIGENIC DETERMINANTS, 5740
- LEUKOCYTES
  - RNA POLYMERASE, 5921
- LYMPHOCYTE TRANSFORMATION
  - CELL CYCLE KINETICS, 5884
- B-LYMPHOCYTES
  - GLUTAMYL TRANSPEPTIDASE, 5984*
- T-LYMPHOCYTES
  - GLUTAMYL TRANSPEPTIDASE, 5984*
- MITOMYCIN C
  - LYMPHOCYTE CULTURE TEST, MIXED, 5759*
  - LYMPHOCYTE TRANSFORMATION, 5759*
- NEOPLASM TRANSPLANTATION
  - A-TYPE PARTICLES, 5657
  - C-TYPE PARTICLES, 5657
  - ULTRASTRUCTURAL STUDY, MOUSE, 5657
- NEUROFIBROMATOSIS
  - CASE REPORT, 5813*
- NUCLEOTIDES
  - RNA, TRANSFER, 5989*
- PLANT AGGLUTININS
  - LYMPHOCYTE TRANSFORMATION, 5884
- PRECANCEROUS CONDITIONS
  - EPIDEMIOLOGY, ADULT, 5883
- TETRAHYDROFOLATE DEHYDROGENASE
  - HISTOLOGICAL STUDY, 5982*

LEUKEMIA, MYELOCYTIC
- ANTIGENS, NEOPLASM
  - IMMUNE SERUMS, 5740
- BREAST NEOPLASMS
  - ADENOCARCINOMA, 5814*
  - CARCINOMA, DUCTAL, 5814*

    CASE REPORT, 5814*
    CHROMOSOMES, HUMAN, 21-22, 5814*
  CHROMOSOME ABERRATIONS
    BONE MARROW CELLS, 5807
    DIAGNOSIS AND PROGNOSIS, 5527*
    LYMPHOID TISSUE, 5807
  CHROMOSOMES, HUMAN, 21-22
    ANTIBODY SPECIFICITY, 5740
    ANTIGENS, NEOPLASM, 5740
    CHROMOSOME ABERRATIONS, REVIEW, 5453
  DIBUTYRYL CYCLIC AMP
    DNA REPLICATION, 5730
  GENETICS
    EPIDEMIOLOGY, CHILD, 5882
  KARYOTYPING
    BONE MARROW CELLS, 5807
    LYMPHOID TISSUE, 5807
  LEUKEMIA, MYELOBLASTIC
    ANTIBODY SPECIFICITY, 5740
    ANTIGENIC DETERMINANTS, 5740
  LEUKOCYTES
    RNA POLYMERASE, 5921
  NUCLEOTIDES
    RNA, TRANSFER, 5989*
  PRECANCEROUS CONDITIONS
    EPIDEMIOLOGY, ADULT, 5883
  SODIUM FLUORIDE
    ADENOSINE CYCLIC 3',5' MONOPHOSPHATE, 5730
  TETRAHYDROFOLATE DEHYDROGENASE
    HISTOLOGICAL STUDY, 5982*
  THEOPHYLLINE
    ADENOSINE CYCLIC 3',5' MONOPHOSPHATE, 5730

LEUKOCYTE CULTURE TEST, MIXED
  BLADDER NEOPLASMS
    DIAGNOSIS AND PROGNOSIS, REVIEW, 5862*

LEUKOCYTES
  HYDROLASES
    STREPTOCOCCUS, 5761*
    STREPTOCOCCUS FAECALIS, 5761*
  LEUKEMIA, LYMPHOCYTIC
    RNA POLYMERASE, 5921
  LEUKEMIA, MYELOBLASTIC
    RNA POLYMERASE, 5921
  LEUKEMIA, MYELOCYTIC
    RNA POLYMERASE, 5921
  NOGALAMYCIN
    CHROMOSOME ABERRATIONS, 5613*

LEUKOPLAKIA, ORAL
  ARECA
    EPIDEMIOLOGY, INDIA, 5890*
  SEX FACTORS
    EPIDEMIOLOGY, INDIA, 5890*
  SMOKING
    EPIDEMIOLOGY, INDIA, 5890*
  TOBACCO
    EPIDEMIOLOGY, INDIA, 5890*

LEYDIG CELL TUMOR
  LUNG NEOPLASMS
    ULTRASTRUCTURAL STUDY, 5855*
  NEOPLASMS, MULTIPLE PRIMARY
    EPIDEMIOLOGY, RAT, 5895*
  TRANSPLANTATION, HOMOLOGOUS
    SYNGENEIC MUSCLE SANDWICH GRAFT, 5771*

LIGHT
  SKIN DISEASES
    DNA REPAIR, 5624
  XERODERMA PIGMENTOSUM
    DNA REPAIR, 5624

LIPIDS
  AGING
    AUTOOXIDATION, REVIEW, 5476
  CELL DIVISION
    AUTOOXIDATION, REVIEW, 5476
  CELL MEMBRANE
    AUTOOXIDATION, REVIEW, 5476
  CERVIX NEOPLASMS
    ISOLATION AND CHARACTERIZATION, 5940*
    SUBCELLULAR FRACTIONS, 5940*
  LIVER NEOPLASMS
    ACETAMIDE, N-FLUOREN-2-YL-, 5598*

LIPOPROTEINS
  ESTRADIOL
    XENOPUS LAEVUS, 5954*

LIVER
  CELLS, CULTURED
    CARBOXY-LYASES, 5468
    LEUCINE INCORPORATION, 5468
    ULTRASTRUCTURAL STUDY, 5468
  DIETHYLAMINE, N-NITROSO-
    ULTRASTRUCTURAL STUDY, RAT, 5608*
  DIMETHYLAMINE, N-NITROSO-
    ULTRASTRUCTURAL STUDY, RAT, 5608*
  DIPROPYLAMINE, N-NITROSO-
    ULTRASTRUCTURAL STUDY, RAT, 5608*
  MAMMARY NEOPLASMS, EXPERIMENTAL
    CITRIC ACID, 5969*
    COENZYME A, 5969*
  SARCOMA
    CITRIC ACID, 5969*
    COENZYME A, 5969*

LIVER CIRRHOSIS
  ACETAMIDE, N-FLUOREN-2-YLDI-
    AGE FACTORS, RAT, 5596*
  ALPHA 1 ANTITRYPSIN
    PROTEINS, 5852*

LIVER DISEASES
  CARCINOEMBRYONIC ANTIGEN
    SERUM LEVELS, 5753*

LIVER NEOPLASMS
  SEE ALSO HEPATOMA
  ACETAMIDE, N-FLUOREN-2-YL-
    ADENOSINE TRIPHOSPHATASE, 5579
    GANGLIOSIDES, 5598*
    LIPIDS, 5598*
    PRECANCEROUS CONDITIONS, 5579
    SIALIC ACIDS, 5598*
  ADENOCARCINOMA
    BENZENAMINE, N,N-DIMETHYL-4-((3-METHYLPHENYL)AZO)-, 5547
  ADENOMA
    CONTRACEPTIVES, ORAL, 5557

- AGE FACTORS
  - EPIDEMIOLOGY, 5877
- ALPHA 1 ANTITRYPSIN
  - PROTEINS, 5852*
- ANGIOSARCOMA
  - ETHYLENE, CHLORO-, 5819*
- BENZENAMINE, N,N-DIMETHYL-4-((3-METHYLPHENYL)AZO)-
  - CATALASE, 5547
  - ORGANOIDS, 5547
  - PROPIONIC ACID, 2-(P-CHLOROPHENOZY)-2-METHYL-, ETHYL ESTER, 5547
  - ULTRASTRUCTURAL STUDY, 5547
- BUTYRIC ACID, 2-AMINO-4-(ETHYLTHIO)-
  - ALKALINE TRIPHOSPHATASE, 5579
  - PRECANCEROUS CONDITIONS, 5579
- CALCIUM
  - ALKALINE PHOSPHATASE, 5993*
- CARCINOGEN, CHEMICAL
  - PRECANCEROUS CONDITIONS, REVIEW, 5403
- CELL LINE
  - ALKALINE PHOSPHATASE, 5993*
- CELL MEMBRANE
  - ALKALINE PHOSPHATASE, 5993*
- CONTRACEPTIVES, ORAL
  - CASE REPORT, 5557
  - HISTOLOGICAL STUDY, REVIEW, 5494*
  - REVIEW, 5557
- DIETHYLAMINE, N-NITROSO-
  - ADENOSINE TRIPHOSPHATASE, 5579
  - PRECANCEROUS CONDITIONS, 5579
- DIMETHYLAMINE, N-NITROSO-
  - ADENOSINE TRIPHOSPHATASE, 5579
  - PRECANCEROUS CONDITIONS, 5579
- ETHANE, 1,1,1-TRICHLORO-2,2-BIS(P-CHLOROPHENYL)-
  - ENZYMATIC ACTIVITY, 5405
- ETHYLENE, CHLORO-
  - CASE REPORT, 5819*
- HAMARTOMA
  - EPIDEMIOLOGY, 5461
  - REVIEW, 5461
- HEMANGIOENDOTHELIOMA
  - EPIDEMIOLOGY, 5461
  - REVIEW, 5461
- HEPATOMA
  - EPIDEMIOLOGY, 5461
  - REVIEW, 5461
- HYPERPLASIA
  - ACETAMIDE, N-FLUOREN-2-YL-, 5598*
- MAGNESIUM
  - ALKALINE PHOSPHATASE, 5993*
- NECROSIS
  - VIRUS, HERPES SIMPLEX 1, 5719*
  - VIRUS, HERPES SIMPLEX 2, 5719*
- NEOPLASM METASTASIS
  - EPIDEMIOLOGY, 5877
- NITROSAMINES
  - CARCINOGENIC ACTIVITY, REVIEW, 5403
- POLYCYCLIC HYDROCARBONS
  - CARCINOGENIC ACTIVITY, REVIEW, 5403
- PRECANCEROUS CONDITIONS
  - ENZYMATIC ACTIVITY, 5405
- RIDDELLINE
  - CARCINOGENIC ACTIVITY, RAT, MOUSE, 5418
  - ISOLATION AND CHARACTERIZATION, 5418
- M-TOLUIDINE, N,N-DIMETHYL-4-(PHENYLAZO)-
  - ADENOSINE TRIPHOSPHATASE, 5579
  - PRECANCEROUS CONDITIONS, 5579
- VIRUS, HERPES SIMPLEX 1
  - AGE FACTORS, 5719*
  - STRAIN DIFFERENCE, MOUSE, 5719*
- VIRUS, HERPES SIMPLEX 2
  - AGE FACTORS, 5719*
  - STRAIN DIFFERENCE, MOUSE, 5719*

LIVER REGENERATION
- ALKALINE PHOSPHATASE
  - DNA REPLICATION, 5994*
- ALPHA-AMANITINE
  - DNA POLYMERASE, 5991*
- CHROMATIN
  - TEMPLATE CAPACITY, 5999*
- NUCLEOTIDASES
  - DNA REPLICATION, 5994*
- NUCLEOTIDES
  - ALKALINE PHOSPHATASE, 5997*
  - ISOLATION AND CHARACTERIZATION, 5997*
- RNA
  - RNA-DNA HYBRIDIZATION, 5929*

LUNG
- RADIATION, IONIZING
  - LYMPHATIC CHANNELS, REVIEW, 5510*
- RADIOISOTOPES
  - LYMPHATIC CHANNELS, REVIEW, 5510*
- SMOKING
  - ALVEOLAR HISTICOTYES, FLUORESCENT, 5487*
  - ENZYMATIC ACTIVITY, 5487*

LUNG DISEASES
- CARCINOEMBRYONIC ANTIGEN
  - SERUM LEVELS, 5753*

LUNG NEOPLASMS
- ADENOCARCINOMA
  - EPIDEMIOLOGY, REVIEW, 5480*
- ADENOMA
  - PLUTONIUM, 5627*
- AGE FACTORS
  - EPIDEMIOLOGY, EAST GERMANY, 5891*
- ALPHA 1 ANTITRYPSIN
  - PROTEINS, 5852*
- ASBESTOS
  - EPIDEMIOLOGY, REVIEW, 5486*
- ASBESTOSIS
  - CASE REPORT, 5802
  - OCCUPATIONAL HAZARD, 5802
  - SMOKING, 5802
- BENZO(A)PYRENE
  - METABOLISM, RAT AND HAMSTER, 5567
- CARCINOEMBRYONIC ANTIGEN
  - SERUM LEVELS, 5753*
- CARCINOMA
  - ASBESTOSIS, 5802
- CARCINOMA, BRONCHIOLAR
  - EPIDEMIOLOGY, REVIEW, 5480*
  - PLUTONIUM, 5627*
- CARCINOMA, EPIDERMOID
  - EPIDEMIOLOGY, REVIEW, 5480*

- CARCINOMA, OAT CELL
  - EPIDEMIOLOGY, REVIEW, 5480*
- DIAGNOSIS AND PROGNOSIS
  - EPIDEMIOLOGY, WOMEN, WALES, 5872
- ETHANE, 2-BROMO-2-CHLORO-1,1,1-TRIFLUORO-
  - NEOPLASM METASTASIS, 5741
- FIBROBLASTS
  - CELL TRANSFORMATION, NEOPLASTIC, 5905
  - KARYOTYPING, 5905
- GRANULOMA
  - CASE REPORT, 5787
  - ULTRASTRUCTURAL STUDY, 5787
- LEYDIG CELL TUMOR
  - ULTRASTRUCTURAL STUDY, 5855*
- T-LYMPHOCYTES
  - ANTILYMPHOCYTE SERUM, 5755*
  - GROWTH, 5755*
  - IMMUNITY, CELLULAR, 5755*
  - TRANSPLANTATION IMMUNOLOGY, 5755*
- MESOTHELIOMA
  - ASBESTOSIS, 5802
- NEOPLASM METASTASIS
  - EPIDEMIOLOGY, EAST GERMANY, 5891*
- OCCUPATIONAL HAZARD
  - EPIDEMIOLOGY, 5870
  - EPIDEMIOLOGY, REVIEW, 5486*
- PLUTONIUM
  - PARTICLE RETENTION, REVIEW, 5502*
  - TISSUE DISTRIBUTION, DOG, 5627*
- REVERSE TRANSCRIPTASE
  - ISOLATION AND CHARACTERIZATION, 5700
- RNA, VIRAL
  - DNA-RNA HYBRIDIZATION, 5700
  - ISOLATION AND CHARACTERIZATION, 5700
- SEX FACTORS
  - EPIDEMIOLOGY, EAST GERMANY, 5891*
- SJOGREN'S SYNDROME
  - CASE REPORT, 5815*
- SMOKING
  - EPIDEMIOLOGY, REVIEW, 5480*
  - EPIDEMIOLOGY, WOMEN, WALES, 5872

LYMPH NODE EXCISION
- MELANOMA
  - TREATMENT AND PROGNOSIS, 5794

LYMPH NODES
- BLADDER NEOPLASMS
  - IMMUNE RESPONSE, REVIEW, 5862*
- HODGKIN'S DISEASE
  - DNA REPLICATION, 5859*
- MELANOMA
  - HISTOLOGICAL STUDY, 5466
  - NEOPLASM METASTASIS, 5466
- NEOPLASM METASTASIS
  - IMMUNE RESPONSE, REVIEW, 5465
- PLUTONIUM
  - CARCINOGENIC ACTIVITY, REVIEW, 5502*
  - LUNG, REVIEW, 5502*

LYMPHATIC NEOPLASMS
- ANEMIA, APLASTIC
  - GENETICS, 5806
- ATAXIA TELANGIECTASIA
  - GENETICS, 5806
- IMMUNOSUPPRESSION
  - EPIDEMIOLOGY, REVIEW, 5881

LYMPHATIC SYSTEM
- RADIATION, IONIZING
  - CARCINOGENIC POTENTIAL, REVIEW, 5497*
  - ULTRASTRUCTURAL STUDY, REVIEW, 5497*

LYMPHOCYTE DEPLETION
- HODGKIN'S DISEASE
  - T-LYMPHOCYTES, 5728

LYMPHOCYTE TRANSFORMATION
- CARCINOMA
  - IMMUNITY, CELLULAR, 5736
- LEUKEMIA, LYMPHOBLASTIC
  - CELL CYCLE KINETICS, 5884
  - PLANT AGGLUTININS, 5884
- LEUKEMIA, MYELOBLASTIC
  - ANTIGENS, NEOPLASM, 5759*
  - CELL CYCLE KINETICS, 5884
  - IMMUNOTHERAPY, 5759*
  - MITOMYCIN C, 5759*
  - PLANT AGGLUTININS, 5884
- B-LYMPHOCYTES
  - INHIBITORY FACTOR, ISOLATION, 5754*
- T-LYMPHOCYTES
  - INHIBITORY FACTOR, ISOLATION, 5754*
- LYMPHOMA
  - VIRUS, GROSS MURINE LEUKEMIA, 5762*
- OVARIAN NEOPLASMS
  - PLANT AGGLUTININS, 5737
- PLANT AGGLUTININS
  - ADENOSINE CYCLIC 3',5' MONOPHOSPHATE, 5730
- SARCOMA
  - IMMUNE RESPONSE, 5774*
  - NEOPLASM METASTASIS, 5774*
- VIRUS, AVIAN LEUKOSIS
  - T-LYMPHOCYTES, 5701*
  - PLANT AGGLUTININS, 5701*

LYMPHOCYTES
- ANTIGEN-ANTIBODY COMPLEX
  - IMMUNITY, CELLULAR, REVIEW, 5446
  - SURFACE PROPERTIES, 5766*
- BLADDER NEOPLASMS
  - IMMUNE RESPONSE, REVIEW, 5862*
  - IMMUNOSUPPRESSION, 5729
  - MICROCYTOTOXICITY ASSAY, REVIEW, 5773*
- BREAST NEOPLASMS
  - NUCLEOTIDES, CYCLIC, 5758*
- CELL MEMBRANE
  - CELL DIFFERENTIATION, 5507*
- CELL TRANSFORMATION, NEOPLASTIC
  - IMMUNE RESPONSE, REVIEW, 5444
- DERMATITIS EXFOLIATIVA
  - IMMUNE RESPONSE, 5456
  - REVIEW, 5456
- ERYTHRODERMA
  - CLASSIFICATION, 5752*
- GUANIDINE, 1-METHYL-3-NITRO-1-NITROSO-

    - HYPOXANTHINE PHOSPHORIBOSYLTRANSFERASE, 5606*
    - THIOGUANINE RESISTANCE, 5606*
- HEAD AND NECK NEOPLASMS
    - NUCLEOTIDES, CYCLIC, 5758*
- LARYNGEAL NEOPLASMS
    - ARYL HYDROCARBON HYDROXYLASES, 5600*
- LEUKEMIA
    - IMMUNITY, CELLULAR, 5738
- LEUKEMIA, HAIRY CELL
    - ACID PHOSPHATASE, 5804
- LEUKEMIA, LYMPHOBLASTIC
    - DEOXYRIBONUCLEASE, 5983*
- LEUKEMIA, LYMPHOCYTIC
    - CLASSIFICATION, 5752*
- LEUKEMIA, MONOCYTIC
    - CLASSIFICATION, 5752*
- MAMMARY NEOPLASMS, EXPERIMENTAL
    - IMMUNOSUPPRESSION, 5729
- MELANOMA
    - NUCLEOTIDES, CYCLIC, 5758*
- MYCOSIS FUNGOIDES
    - CLASSIFICATION, 5752*
- SARCOMA, MAST CELL
    - IMMUNITY, CELLULAR, 5738
- SARCOMA, RETICULUM CELL
    - CLASSIFICATION, 5752*
- THYRONINE
    - DNA REPLICATION, 5923
- THYROXINE
    - DNA REPLICATION, 5923
- VIRUS, FRIEND MURINE LEUKEMIA
    - IMMUNITY, CELLULAR, 5653

-LYMPHOCYTES
- ANTIGENS
    - IMMUNE RESPONSE, REVIEW, 5447
- BURKITT'S LYMPHOMA
    - LYMPHOBLASTOGENESIS INHIBITION FACTOR, 5754*
- CELL MEMBRANE
    - COMPLEMENT, 5767*
    - IMMUNOGLOBULINS, FC, 5767*
- HISTOCOMPATIBILITY ANTIGENS
    - ANTIGEN-ANTIBODY REACTIONS, 5767*
    - COMPLEMENT, 5767*
    - IMMUNOGLOBULINS, FC, 5767*
    - ISOANTIGENS, REVIEW, 5528*
- HODGKIN'S DISEASE
    - CLINICAL STAGE, 5728
    - LYMPHOCYTE DEPLETION, 5728
- ISOANTIGENS
    - ANTIGEN-ANTIBODY REACTIONS, 5767*
    - COMPLEMENT, 5767*
    - IMMUNOGLOBULINS, FC, 5767*
- LEUKEMIA, LYMPHOBLASTIC
    - GLUTAMYL TRANSPEPTIDASE, 5984*
    - IMMUNOTHERAPY, 5947*
- LEUKEMIA, LYMPHOCYTIC
    - IMMUNOGLOBULINS, FC, 5731
    - ULTRASTRUCTURAL STUDY, 5731
- LEUKEMIA, MYELOBLASTIC
    - GLUTAMYL TRANSPEPTIDASE, 5984*
- LYMPHOCYTE TRANSFORMATION
    - INHIBITORY FACTOR, ISOLATION, 5754*
- LYMPHOMA
    - ANTIBODY FORMATION, 5770*
- MELANOMA
    - GLUTAMYL TRANSPEPTIDASE, 5984*
- NEOPLASM METASTASIS
    - NUCLEOTIDES, CYCLIC, 5757*
    - PROSTAGLANDINS E, 5757*
- SKIN NEOPLASMS
    - LYMPHOMA, 5752*
- VIRUS, C-TYPE
    - MITOGENS, 5713*
    - VIRUS REPLICATION, 5713*
- VIRUS, EPSTEIN-BARR
    - LYMPHOCYTE TRANSFORMATION, REVIEW, 5689

T-LYMPHOCYTES
- ANTIGENS
    - IMMUNE RESPONSE, REVIEW, 5447
- CONCANAVALIN A
    - IMMUNE RESPONSE, REVIEW, 5447
- HISTOCOMPATIBILITY ANTIGENS
    - ISOANTIGENS, REVIEW, 5528*
- HODGKIN'S DISEASE
    - CLINICAL STAGE, 5728
    - DIAGNOSIS AND PROGNOSIS, 5747
    - IMMUNITY, CELLULAR, 5747
    - LYMPHOCYTE DEPLETION, 5728
- LEUKEMIA
    - GLYCOPROTEINS, 5910
    - IODOPROTEINS, 5910
    - LYMPHOBLASTOGENESIS INHIBITION FACTOR, 5754*
- LEUKEMIA, LYMPHOBLASTIC
    - GLUTAMYL TRANSPEPTIDASE, 5984*
- LEUKEMIA, LYMPHOCYTIC
    - IMMUNOGLOBULINS, FC, 5731
    - ULTRASTRUCTURAL STUDY, 5731
- LEUKEMIA, MYELOBLASTIC
    - GLUTAMYL TRANSPEPTIDASE, 5984*
- LUNG NEOPLASMS
    - ANTILYMPHOCYTE SERUM, 5755*
    - GROWTH, 5755*
    - IMMUNITY, CELLULAR, 5755*
    - TRANSPLANTATION IMMUNOLOGY, 5755*
- LYMPHOCYTE TRANSFORMATION
    - INHIBITORY FACTOR, ISOLATION, 5754*
- LYMPHOMA
    - ANTIBODY FORMATION, 5770*
- MACROPHAGES
    - IMMUNE RESPONSE, REVIEW, 5447
- MELANOMA
    - ANTILYMPHOCYTE SERUM, 5833*
    - GLUTAMYL TRANSPEPTIDASE, 5984*
- NEOPLASMS
    - NUCLEOTIDES, CYCLIC, 5757*
    - PROSTAGLANDINS E, 5757*
- SKIN NEOPLASMS
    - LYMPHOMA, 5752*
- VIRUS, AVIAN LEUKOSIS
    - LYMPHOCYTE TRANSFORMATION, 5701*
    - VIRUS REPLICATION, 5701*
- VIRUS, FRIEND MURINE LEUKEMIA
    - IMMUNITY, CELLULAR, 5756*
    - IMMUNITY, PASSIVE, 5756*
- VIRUS, HERPES SIMPLEX 2
    - IMMUNE RESPONSE, 5719*
- VIRUS, LACTATE DEHYDROGENASE
    - IMMUNITY, CELLULAR, 5749
- VIRUS, MOLONEY MURINE LEUKEMIA

- IMMUNITY, CELLULAR, 5749

LYMPHOID TISSUE
- LEUKEMIA, MYELOCYTIC
  - CHROMOSOME ABERRATIONS, 5807
  - KARYOTYPING, 5807

LYMPHOKINES
- HEMATOPOIETIC STEM CELLS
  - CELLS, CULTURED, REVIEW, 5934*
- MELANOMA
  - MEMBRANE POTENTIALS, 5744

LYMPHOMA (GENERAL AND UNSPECIFIED)
- SEE ALSO HODGKIN'S DISEASE/BURKITT'S LYMPHOMA/SARCOMA, RETICULUM CELL/LYMPHOSARCOMA
- ANTIBODY FORMATION
  - IMMUNITY, CELLULAR, 5770*
- BLOOD COAGULATION
  - CELL TRANSFORMATION, NEOPLASTIC, 5676
- CELL MEMBRANE
  - CHOLESTEROL, 5961*
- CHOLESTEROL
  - GLUCOSE, 5961*
- GRAFT VS HOST REACTION
  - REVIEW, 5742
- GUANIDINE, 1-METHYL-3-NITRO-1-NITROSO-
  - DNA REPAIR, 5581, 5583
  - DNA REPLICATION, 5583
  - DNA, SINGLE STRANDED, 5581
- HEMOSTASIS
  - CELL TRANSFORMATION, NEOPLASTIC, 5676
- HISTOCOMPATIBILITY ANTIGENS
  - ANTIBODIES, HETEROTYPIC, 5724
  - DEREPRESSION, 5724
- IMMUNOGLOBULINS, SURFACE
  - SJOGREN'S SYNDROME, 5815*
- IMMUNOLOGIC DEFICIENCY SYNDROMES
  - CASE REPORT, CHRONIC LYMPHADENOPATHY, 5828*
  - REVIEW, 5452
- IMMUNOSUPPRESSION
  - REVIEW, 5452
- B-LYMPHOCYTES
  - ANTIBODY FORMATION, 5770*
- T-LYMPHOCYTES
  - ANTIBODY FORMATION, 5770*
- NEOPLASM CIRCULATING CELLS
  - SJOGREN'S SYNDROME, 5815*
- ONCOGENIC VIRUSES
  - BLOOD COAGULATION, 5676
  - HEMOSTASIS, 5676
- RADIATION, IONIZING
  - CARCINOGENIC POTENTIAL, REVIEW, 5497*
  - THYROTROPIN, 5621
- SJOGREN'S SYNDROME
  - CASE REPORT, 5815*
- SKIN NEOPLASMS
  - B-LYMPHOCYTES, 5752*
  - T-LYMPHOCYTES, 5752*
- SPLEEN
  - ANTIBODY FORMATION, 5770*
- THYROID NEOPLASMS
  - CASE REPORT, 5816*
  - CHROMOSOME ABERRATIONS, 5816*
  - RADIATION, IONIZING, 5621
  - RADIOTHERAPY, 5621
- TRANSPLANTATION, HOMOLOGOUS
  - REVIEW, 5452
- URIDINE, 2'-DEOXY-5-IODO-
  - DNA REPAIR, 5583
  - DNA REPLICATION, 5583
- VIRUS, C-TYPE RNA TUMOR
  - MOUSE, WILD, REVIEW, 5649
- VIRUS, GROSS MURINE LEUKEMIA
  - CYROPRESERVATION, 5762*
  - IMMUNITY, CELLULAR, 5762*
  - LYMPHOCYTE CYTOTOXICITY, 5762*
  - LYMPHOCYTE TRANSFORMATION, 5762*
  - SYNERGISTIC VIRAL ONCOGENESIS, MOUSE, 5659
  - VIRUS REPLICATION, 5659
- VIRUS, HERPES
  - EPIDEMIOLOGY, BABOON, 5688
- VIRUS, HERPES SAIMIRI
  - VIRAL VACCINES, 5696
  - WHITE RABBIT, 5697
- VIRUS, MAREK'S DISEASE HERPES
  - ULTRASTRUCTURAL STUDY, REVIEW, 5504*
- VIRUS, MOLONEY MURINE LEUKEMIA
  - IMMUNITY, CELLULAR, 5749

LYMPHOSARCOMA
- BREAST NEOPLASMS
  - HISTOLOGICAL STUDY, 5812*
- CONCANAVALIN A
  - BINDING, 5958*
- ESTROGENS
  - PLANT AGGLUTININS, BINDING, 5958*
- GALACTOSE
  - PLANT AGGLUTININS, BINDING, 5958*
- GASTROINTESTINAL NEOPLASMS
  - HISTOLOGICAL STUDY, 5812*
- HISTOCOMPATIBILITY ANTIGENS
  - ANTIBODIES, HETEROTYPIC, 5724
  - DEREPRESSION, 5724
- MACROPHAGES
  - CHEMOTAXIS, INHIBITORY FACTOR, 5763*
- METHYLGLYCOSIDES
  - PLANT AGGLUTININS, BINDING, 5958
- NEOPLASM METASTASIS
  - ULTRASTRUCTURAL STUDY, RABBIT, 5823*
- PEPTIDE HYDROLASES
  - PLANT AGGLUTININS, BINDING, 595
- PLANT AGGLUTININS
  - BINDING, 5958*
- RESERPINE
  - CARCINOGENIC ACTIVITY, MOUSE, 54
- SPLENIC NEOPLASMS
  - HISTOLOGICAL STUDY, 5812*
- TESTICULAR NEOPLASMS
  - HISTOLOGICAL STUDY, 5812*
- TRYPSIN
  - PLANT AGGLUTININS, BINDING, 595
- VIRUS, FELINE LEUKEMIA
  - EPIDEMIOLOGY, REVIEW, 5512*
- VIRUS-LIKE PARTICLES
  - ULTRASTRUCTURAL STUDY, RABBIT,

5823*

- LYSINE, EPSILON-N-TRIMETHYL-
  - NEOPLASMS, EXPERIMENTAL
    - MITOSIS, 5935*
    - NUCLEIC ACIDS, 5935*
    - ULTRASTRUCTURAL STUDY, 5935*

- LYSOSOMES
  - LEUKEMIA, HAIRY CELL
    - ACID PHOSPHATASE, 5917

- MACROPHAGES
  - ANTIGEN-ANTIBODY COMPLEX
    - SURFACE PROPERTIES, 5766*
  - BLADDER NEOPLASMS
    - IMMUNOSUPPRESSION, 5729
  - COLCHICINE
    - MICROTUBULES, 5775*
  - FIBROSARCOMA
    - CHEMOTAXIS, INHIBITORY FACTOR, 5763*
  - HEPATOMA
    - CHEMOTAXIS, INHIBITORY FACTOR, 5763*
  - HISTOCOMPATIBILITY ANTIGENS
    - ISOANTIGENS, REVIEW, 5528*
  - LEUKEMIA
    - IMMUNE SERUMS, 5738
    - IMMUNITY, CELLULAR, 5738
  - T-LYMPHOCYTES
    - IMMUNE RESPONSE, REVIEW, 5447
  - LYMPHOSARCOMA
    - CHEMOTAXIS, INHIBITORY FACTOR, 5763*
  - MAMMARY NEOPLASMS, EXPERIMENTAL
    - IMMUNOSUPPRESSION, 5729
  - MELANOMA
    - MEMBRANE POTENTIALS, 5744
  - MELANOSIS
    - MEMBRANE POTENTIALS, 5744
  - SARCOMA, MAST CELL
    - IMMUNE SERUMS, 5738
    - IMMUNITY, CELLULAR, 5738
  - SKIN NEOPLASMS
    - MEMBRANE POTENTIALS, 5744
  - STAPHYLOCOCCUS
    - ULTRASTRUCTURAL STUDY, 5761*
  - TERATOID TUMOR
    - CHEMOTAXIS, INHIBITORY FACTOR, 5763*

- MAGNESIUM
  - LIVER NEOPLASMS
    - ALKALINE PHOSPHATASE, 5993*
  - PHOSPHODIESTERASES
    - CELL TRANSFORMATION, NEOPLASTIC, 5987*

- MALARIA
  - AUSTRALIA ANTIGEN
    - EPIDEMIOLOGY. SOUTH VIETNAM, 5875
    - FETAL GLOBULINS, 5875
  - FETAL GLOBULINS
    - EPIDEMIOLOGY, SOUTH VIETNAM, 5875

- MALATE DEHYDROGENASE
  - MAMMAE
    - CELLS, CULTURED, 5972*

- MAMMAE
  - CELL DIFFERENTIATION
    - GONADECTOMY, MOUSE, 5781
  - CYTOCHROME OXIDASE
    - CELLS, CULTURED, 5972*
  - MALATE DEHYDROGENASE
    - CELLS, CULTURED, 5972*
  - METHANESULFONIC ACID, METHYL ESTER
    - DNA REPAIR, 5588
  - OXIDOREDUCTASES
    - CELLS, CULTURED, 5972*
  - PHOSPHOTRANSFERASES, ATP
    - CELLS, CULTURED, 5972*
  - PROTEINS
    - CELLS, CULTURED, 5972*
  - SUCCINATE DEHYDROGENASE
    - CELLS, CULTURED, 5972*
  - UREA, METHYL NITROSO-
    - DNA REPAIR, 5588

- MAMMARY NEOPLASMS, EXPERIMENTAL
  - ADENOCARCINOMA
    - CHOLANTHRENE, 3-METHYL-, 5741
    - CHYMOTRYPSIN, 5959*
    - COLLAGEN, 5938*
    - CONCANAVALIN A, 5959*
    - DEOXYRIBONUCLEASE, 5959*
    - NEURAMINIDASE, 5745, 5959*
    - PAPAIN, 5959*
    - PROLINE HYDROXYLASE, 5938*
    - PRONASE, 5959*
    - RIBONUCLEASE, 5959*
    - TRYPSIN, 5959*
  - ADRENAL GLANDS
    - STRESS, 5604*
  - ANTIGENS, NEOPLASM
    - IMMUNITY, CELLULAR, 5739
  - ASCORBIC ACID
    - STRESS, 5604*
  - BENZ(A)ANTHRACENE, 7,12-DIMETHYL-
    - STRESS, 5604*
  - BENZOIC ACID, P-AMINO-, 2-(DIETHYLAMINO)ETHYL ESTER
    - PRECANCEROUS CONDITIONS, 5561
  - CELLS, CULTURED
    - BLOCKING FACTORS, 5729
  - CHOLANTHRENE, 3-METHYL-
    - TRANSPLANTATION IMMUNOLOGY, 5741
  - CHYMOTRYPSIN
    - POLY U, 5959*
  - CORTISOL
    - PRECANCEROUS CONDITIONS, 5561
  - ETHANE, 2-BROMO-2-CHLORO-1,1,1-TRIFLUORO-
    - NEOPLASM METASTASIS, 5741
    - TRANSPLANTATION IMMUNOLOGY, 5741
  - FERTILITY
    - CELL CYCLE KINETICS, MOUSE, 5885
  - FIBRINOGEN
    - THROMBOPLASTIN, 5941*
  - FIBRINOLYSIS
    - THROMBOPLASTIN, 5941*
  - INSULIN
    - PRECANCEROUS CONDITIONS, 5561
  - LIVER
    - CITRIC ACID, 5969*
    - COENZYME A, 5969*
  - LYMPHOCYTES
    - IMMUNOSUPPRESSION, 5729

    MACROPHAGES
        IMMUNOSUPPRESSION, 5729
    MYCOBACTERIUM BOVIS
        IMMUNE RESPONSE, 5745
    NEOPLASMS, MULTIPLE PRIMARY
        EPIDEMIOLOGY, RAT, 5895*
    NEURAMINIDASE
        IMMUNE RESPONSE, 5745
        TRANSPLANTATION IMMUNOLOGY, 5745
    PROLACTIN
        PRECANCEROUS CONDITIONS, 5561
    RESERPINE
        CARCINOGENIC ACTIVITY, MOUSE, 5414
    TRYPSIN
        POLY U, 5959*
    VIRUS-LIKE PARTICLES
        BENZ(A)ANTHRACENE, 7,12-DIMETHYL-, 5707*
        CARCINOMA, 5707*
        ISOLATION AND CHARACTERIZATION, 5707*
        VIRUS, MURINE MAMMARY TUMOR, 5707*
    VIRUS, MURINE MAMMARY TUMOR
        ANTIGENS, NEOPLASM, 5739
        CYTOTOXICITY TESTS, IMMUNOLOGIC, 5739

MANDIBULAR NEOPLASMS
    NEOPLASM METASTASIS
        EPIDEMIOLOGY, 5877

MANGANESE
    PHOSPHODIESTERASES
        CELL TRANSFORMATION, NEOPLASTIC, 5987*

MEDIASTINAL NEOPLASMS
    CARCINOID TUMOR
        CASE REPORT, 5786
        ROSETTE FORMATION, 5786

MEDULLOBLASTOMA
    RADIATION, IONIZING
        THYROTROPIN, 5621
    THYROID NEOPLASMS
        RADIATION, IONIZING, 5621

MELANOBLASTOMA
    MELANOMA
        NEVUS, 5462

MELANOCYTES
    GALLBLADDER NEOPLASMS
        MELANOMA, 5791

MELANOMA
    ALANINE, 3-(3,4-DIHYDROXYPHENYL)-
        METABOLISM, 5792
    ANTIGENS, NEOPLASM
        DIAGNOSIS AND PROGNOSIS, 5734
        HYPERSENSITIVITY, DELAYED, 5723
        IMMUNITY, CELLULAR, 5734
        ISOLATION AND CHARACTERIZATION, 5723
    ANTILYMPHOCYTE SERUM
        GROWTH, 5833*
    BCG VACCINATION
        MEMBRANE POTENTIALS, 5744
    CELL DIFFERENTIATION
        ULTRASTRUCTURAL STUDY, 5834*
    CELL LINE
        KARYOTYPING, 5834*
    CELL MEMBRANE
        CELL CYCLE KINETICS, 5790
        IMMUNITY, CELLULAR, 5744
        TRANSFERASES, 5996*
        ULTRASTRUCTURAL STUDY, 5790
    CELLULOSE, METHYL ETHER
        CHROMOSOME ABNORMALITIES, 5833*
    CHROMOSOME ABERRATIONS
        KARYOTYPING, 5793
    CHROMOSOME ABNORMALITIES
        NEOPLASM METASTASIS, 5833*
    DIBUTYRYL CYCLIC AMP
        CELL DIFFERENTIATION, 5834*
    DIPHENOL OXIDASES
        GROWTH, 5952*
        ULTRASTRUCTURAL STUDY, 5792
    DNA
        DNA-RNA HYBRIDIZATION, 5718*
    EAR NEOPLASMS
        EPIDEMIOLOGY, USSR, 5876
    GALLBLADDER NEOPLASMS
        CASE REPORT, 5791
        HISTOLOGICAL STUDY, 5791
        MELANOCYTES, 5791
    GLIOBLASTOMA MULTIFORME
        ANTIGENIC DETERMINANTS, 5717*
    LEUKEMIA
        ANTIGENIC DETERMINANTS, 5717*
    LYMPH NODE EXCISION
        TREATMENT AND PROGNOSIS, 5794
    LYMPH NODES
        HISTOLOGICAL STUDY, 5466
    LYMPHOCYTES
        NUCLEOTIDES, CYCLIC, 5758*
    B-LYMPHOCYTES
        GLUTAMYL TRANSPEPTIDASE, 5984*
    T-LYMPHOCYTES
        ANTILYMPHOCYTE SERUM, 5833*
        GLUTAMYL TRANSPEPTIDASE, 5984*
    LYMPHOKINES
        MEMBRANE POTENTIALS, 5744
    MACROPHAGES
        MEMBRANE POTENTIALS, 5744
    MIGRATION INHIBITORY FACTOR
        DIAGNOSIS AND PROGNOSIS, 5734
        IMMUNITY, CELLULAR, 5734
    MITOMYCIN C
        TREATMENT AND PROGNOSIS, 5794
    MSH
        ADENOSINE CYCLIC 3',5' MONOPHOSPHATE, 5952*
        DIPHENOL OXIDASES, 5952*
    NEOPLASM METASTASIS
        HISTOLOGICAL STUDY, 5466
        LYMPH NODES, 5466
        TREATMENT AND PROGNOSIS, 5794
    ONCOGENIC VIRUSES
        DNA-RNA HYBRIDIZATION, 5718*
    PIGMENTATION
        ADENOSINE CYCLIC 3',5' MONOPHOSPHATE, 5835*
        CARCINOGENIC POTENTIAL, 5835*
    REVERSE TRANSCRIPTASE
        ANTIBODY SPECIFICITY, 5717*
        ISOLATION AND CHARACTERIZATION, 5717*

    ULTRASTRUCTURAL STUDY, 5717*
  RNA, VIRAL
    ISOLATION AND CHARACTERIZATION, 5717*
  SKIN NEOPLASMS
    REVIEW, 5789
  SUTURES
    ALLOYS, 5637*
    NEOPLASM TRANSPLANTATION, 5637*
    NYLON, 5637*
    POLYGLYCOLIC ACID, 5637*
    WOUND INFECTION, 5637*
  THEOPHYLLINE
    VIRUS-LIKE PARTICLES, 5834*
  TRANSFERASES
    ISOLATION AND CHARACTERIZATION, 5996*
  TRANSPLANTATION, HOMOLOGOUS
    SYNGENEIC MUSCLE SANDWICH GRAFT, 5771*
  TYROSINE
    METABOLISM, 5792.
  URACIL, 5-FLUORO-
    TREATMENT AND PROGNOSIS, 5794
  URIDINE, 5-BROMO-2'-DEOXY-
    GLUCOSEPHOSPHATE DEHYDROGENASE, 5919
  VIRUS, PARAMYXO
    VIRUS-LIKE PARTICLES, 5834*

ANOSIS
  MACROPHAGES
    MEMBRANE POTENTIALS, 5744

BRANE POTENTIALS
  MELANOMA
    BCG VACCINATION, 5744
    LYMPHOKINES, 5744
    MACROPHAGES, 5744
  MELANOSIS
    MACROPHAGES, 5744
  SKIN NEOPLASMS
    MACROPHAGES, 5744

OPAUSE
  BREAST NEOPLASMS
    RESERPINE, 5558
  ESTROGENS
    UTERINE NEOPLASMS, 5419
  UTERINE NEOPLASMS
    ESTROGENS, 5419

ENCHYMOMA
  OVARIAN NEOPLASMS
    DIAGNOSIS AND TREATMENT, 5533*

SOTHELIOMA
  ASBESTOS
    EPIDEMIOLOGY, REVIEW, 5466*
  LUNG NEOPLASMS
    ASBESTOSIS, 5802
  OCCUPATIONAL HAZARD
    EPIDEMIOLOGY, REVIEW, 5486*
  VIRUS, AVIAN LEUKOSIS
    CARCINOGENIC POTENTIAL, REVIEW, 5511*

TAPLASIA
  LARYNGEAL NEOPLASMS
    HISTOLOGICAL STUDY, 5854*
  TONGUE NEOPLASMS
    HISTOLOGICAL STUDY, 5854*

METHANE, SULFINYLBIS-
  CARCINOMA, EHRLICH TUMOR
    RIBONUCLEOTIDE REDUCTASES, 5916
  VIRUS, FRIEND MURINE LEUKEMIA
    CARCINOGENESIS, CHEMICAL, 5566
  VIRUS, ROUS SARCOMA
    CARCINOGENESIS, CHEMICAL, 5566

METHANESULFONIC ACID, ETHYL ESTER
  HYPOXANTHINE PHOSPHORIBOSYLTRANSFERASE
    MUTAGENIC ACTIVITY, 5607*
  XERODERMA PIGMENTOSUM
    DNA REPAIR, 5622

METHANESULFONIC ACID, METHYL ESTER
  DNA
    REVIEW, 5426
  HELA CELLS
    DNA REPAIR, 5586
  HYPOXANTHINE PHOSPHORIBOSYLTRANSFERASE
    MUTAGENIC ACTIVITY, 5607*
  MAMMAE
    DNA REPAIR, 5588

METHIONINE
  CARCINOMA 256, WALKER
    BUTYRIC ACID, 2-AMINO-4-MERCAPTO-, 5936*
  VIRUS, SV40
    BUTYRIC ACID, 2-AMINO-4-MERCAPTO-, 5936*
    CELL TRANSFORMATION, NEOPLASTIC, 5936*
    METHYLTRANSFERASES, 5936*

METHOTREXATE
  LEUKEMIA L1210
    OXIDOREDUCTASES, 5980*
    TRANSFERASES, 5981*

METHOTREXATE, DICHLORO-
  LEUKEMIA L1210
    OXIDOREDUCTASES, 5980*

N-METHYL-N'-NITRO-N-NITROSOGUANIDINE
  SEE GUANIDINE, 1-METHYL-3-NITRO-1-NITROSO-

METHYL SULFOXIDE
  SEE METHANE, SULFINYLBIS-

3-METHYLCHOLANTHRENE
  SEE CHOLANTHRENE, 3-METHYL-

METHYLGLYCOSIDES
  LYMPHOSARCOMA
    PLANT AGGLUTININS, BINDING, 5958*

METHYLTRANSFERASES
  CARCINOMA 256, WALKER
    BUTYRIC ACID, 2-AMINO-4-MERCAPTO-, 5936*
  VIRUS, SV40
    METHIONINE, 5936*

- MICROBODIES
  - HEPATOMA
    - ULTRASTRUCTURAL STUDY, 5971*
- MICROCEPHALY
  - BRAIN NEOPLASMS
    - UREA, METHYL NITROSO-, 5589
- MICROSOMES
  - LEUKEMIA, HAIRY CELL
    - ACID PHOSPHATASE, 5917
- MICROSOMES, LIVER
  - ACETAMIDE, THIO-
    - CYTOCHROME P-450, 5551
    - ESTRADIOL, 5551
  - CELL MEMBRANE
    - ISOLATION AND CHARACTERIZATION, 5908
    - PHOSPHOLIPIDS, 5908
  - 2-FURALDEHYDE, 5-NITRO-, SEMICARBAZONE
    - REDUCTION PRODUCTS, ISOLATION AND CHARACTERIZATION, 5546
  - 2-FURANACRYLAMIDE, ALPHA-2-FURYL-5-NITRO-
    - REDUCTION PRODUCTS, ISOLATION AND CHARACTERIZATION, 5546
  - PEPTIDES
    - CELL MEMBRANE, 5908
  - PHOSPHOLIPIDS
    - CELL MEMBRANE, 5908
  - TRIAZENE, 3,3-DIMETHYL-1-PHENYL-
    - MUTAGENIC ACTIVITY, 5616*
- MICROTUBULES
  - CELLS, CULTURED
    - IMMUNOFLUORESCENCE, 5775*
  - COLCHICINE
    - FIBROBLASTS, 5775*
    - MACROPHAGES, 5775*
  - FIBROBLASTS
    - CONTACT INHIBITION, 5775*
  - VIRUS, ROUS SARCOMA
    - CELL TRANSFORMATION, NEOPLASTIC, 5775*
    - FIBROBLASTS, 5775*
- MIGRATION INHIBITORY FACTOR
  - MELANOMA
    - DIAGNOSIS AND PROGNOSIS, 5734
    - IMMUNITY, CELLULAR, 5734
- MITOCHONDRIA, LIVER
  - DEXAMETHASONE
    - CHLORAMPHENICOL, 5925
    - CYCLOHEXIMIDE, 5925
    - DNA REPLICATION, 5925
    - ULTRASTRUCTURAL STUDY, 5925
    - UREA, HYDROXY-, 5925
  - ETHIDIUM BROMIDE
    - DNA REPLICATION, 5925
- MITOGENS
  - VIRUS, C-TYPE
    - B-LYMPHOCYTES, 5713*
    - VIRUS REPLICATION, 5713*
- MITOMYCIN C
  - LEUKEMIA, MYELOBLASTIC
    - LYMPHOCYTE CULTURE TEST, MIXED, 5759*
    - LYMPHOCYTE TRANSFORMATION, 5759*
  - MELANOMA
    - TREATMENT AND PROGNOSIS, 5794
- MITOSIS
  - CARCINOMA, EHRLICH TUMOR
    - CELL CYCLE KINETICS, 5899*
  - CHALONES
    - CELL CYCLE KINETICS, 5944*
  - HELA CELLS
    - CELL CYCLE KINETICS, 5898*
  - NEOPLASMS, EXPERIMENTAL
    - LYSINE, EPSILON-N-TRIMETHYL-, 5935*
- MIXED FUNCTION OXIDASE
  - SEE OXIDOREDUCTASES
- MONOCYTES
  - BREAST NEOPLASMS
    - ANTIBODIES, NEOPLASM, 5772*
    - ANTIGEN-ANTIBODY COMPLEX, 5772*
- MSH
  - MELANOMA
    - ADENOSINE CYCLIC 3',5' MONOPHOSPHATE, 5952*
    - DIPHENOL OXIDASES, 5952*
- MUCIN
  - GASTROINTESTINAL NEOPLASMS
    - GUANIDINE, 1-METHYL-3-NITRO-1-NITROSO-, 5582
- MULTIPLE MYELOMA
  - CARCINOEMBRYONIC ANTIGEN
    - SERUM LEVELS, 5753*
  - CYCLOHEXIMIDE
    - IMMUNOGLOBULINS, LIGHT CHAIN, 57
  - HYBRID CELLS
    - IMMUNOGLOBULINS, LIGHT CHAIN, 57
  - PUROMYCIN
    - IMMUNOGLOBULINS, LIGHT CHAIN, 57
- MUTATION
  - CARCINOGEN, CHEMICAL
    - ASSAY SYSTEM, REVIEW, 5401
  - ULTRAVIOLET RAYS
    - TRANSFERASES, 5636*
- MYCOBACTERIUM BOVIS
  - MAMMARY NEOPLASMS, EXPERIMENTAL
    - IMMUNE RESPONSE, 5745
  - ONCOGENIC VIRUSES
    - IMMUNOTHERAPY, REVIEW, 5522*
- MYCOSIS FUNGOIDES
  - CELL TRANSFORMATION, NEOPLASTIC
    - SEZARY CELLS, 5832*
  - ERYTHRODERMA
    - SEZARY CELLS, 5832*
  - LYMPHOCYTES
    - CLASSIFICATION, 5752*
  - NEOPLASM METASTASIS
    - SEZARY CELLS, 5832*
- MYCOTOXINS

- ENVIRONMENTAL HAZARD
  - RISK EVALUATION, REVIEW, 5492*

MYELOID METAPLASIA
- LEUKEMIA
  - EPIDEMIOLOGY, REVIEW, 5454
- POLYCYTHEMIA VERA
  - EPIDEMIOLOGY, REVIEW, 5454

MYELOMA
- SEE MULTIPLE MYELOMA

MYOCARDIAL INFARCT
- GASTROINTESTINAL NEOPLASMS
  - EPIDEMIOLOGY, REVIEW, 5464

MYXOMYCETES
- ANTIBODIES
  - CELL DIVISION, 5904
- CARBOXY-LYASES
  - CELL CYCLE KINETICS, 5985*
- PLASMODIUM
  - CELL CYCLE KINETICS, 5904
  - CELL DIVISION, 5904

1-NAPHTHYLAMINE
- BLADDER NEOPLASMS
  - EPIDEMIOLOGY, REVIEW, 5488*

2-NAPHTHYLAMINE
- BLADDER NEOPLASMS
  - EPIDEMIOLOGY, REVIEW, 5488*
- UROGENITAL NEOPLASMS
  - EPIDEMIOLOGY, REVIEW. 5537*

NASOPHARYNGEAL NEOPLASMS
- VIRUS, EPSTEIN-BARR
  - ANTIGEN-ANTIBODY REACTIONS, REVIEW, 5441
  - CARCINOGENIC POTENTIAL, REVIEW, 5433
  - CELL TRANSFORMATION, NEOPLASTIC, REVIEW, 5439
  - DNA, VIRAL, REVIEW, 5689

NECROSIS
- LIVER NEOPLASMS
  - VIRUS, HERPES SIMPLEX 1, 5719*
  - VIRUS, HERPES SIMPLEX 2, 5719*

NEOPLASM CIRCULATING CELLS
- INTESTINAL NEOPLASMS
  - FIBRINOLYSIS, 5800
- LYMPHOMA
  - SJOGREN'S SYNDROME, 5815*
- NEOPLASM METASTASIS
  - IMMUNE RESPONSE, REVIEW, 5465

NEOPLASM METASTASIS
- BLADDER NEOPLASMS
  - IMMUNE RESPONSE, REVIEW, 5773*
- CARCINOEMBRYONIC ANTIGEN
  - AMINO ACIDS, 5725
- CARCINOMA, BRONCHIOLAR
  - TWINS, 5853*
- CELL ADHESION
  - CELL MEMBRANE, REVIEW, 5523*
- CELL AGGREGATION
  - CELL CULTURE MODEL, REVIEW, 5932*
- CELL CYCLE KINETICS
  - IMMUNE RESPONSE, REVIEW, 5465
- CELL MEMBRANE
  - IMMUNE RESPONSE, 5509*
- EMBOLISM
  - CELL FUSION, 5540*
  - REVIEW, 5540*
- KIDNEY NEOPLASMS
  - NEOPLASM REGRESSION, SPONTANEOUS, 5849*
- LIVER NEOPLASMS
  - EPIDEMIOLOGY, 5877
- LUNG NEOPLASMS
  - EPIDEMIOLOGY, EAST GERMANY, 5891*
  - ETHANE, 2-BROMO-2-CHLORO-1,1,1-TRIFLUORO-, 5741
- LYMPH NODES
  - IMMUNE RESPONSE, REVIEW, 5465
- B-LYMPHOCYTES
  - NUCLEOTIDES, CYCLIC, 5757*
  - PROSTAGLANDINS E, 5757*
- LYMPHOSARCOMA
  - ULTRASTRUCTURAL STUDY, RABBIT, 5823*
- MAMMARY NEOPLASMS, EXPERIMENTAL
  - ETHANE, 2-BROMO-2-CHLORO-1,1,1-TRIFLUORO-, 5741
- MANDIBULAR NEOPLASMS
  - EPIDEMIOLOGY, 5877
- MELANOMA
  - CHROMOSOME ABNORMALITIES, 5833*
  - HISTOLOGICAL STUDY, 5466
  - LYMPH NODES, 5466
  - TREATMENT AND PROGNOSIS, 5794
- MYCOSIS FUNGOIDES
  - SEZARY CELLS, 5832*
- NEOPLASM CIRCULATING CELLS
  - IMMUNE RESPONSE, REVIEW, 5465
- PROSTATIC NEOPLASMS
  - CARCINOMA, 5777
- SARCOMA
  - ANTIBODIES, NEOPLASM, 5774*
  - ETHANE, 2-BROMO-2-CHLORO-1,1,1-TRIFLUORO-, 5741
  - HYPERSENSITIVITY, DELAYED, 5774*
  - LYMPHOCYTE TRANSFORMATION, 5774*
  - VIRUS, CYTOMEGALO, 5692
  - VIRUS, HERPES SIMPLEX, 5692
- SWEAT GLAND NEOPLASMS
  - CASE REPORT, 5840*
- THYROID NEOPLASMS
  - ADENOMA, 5784

NEOPLASM RECURRENCE, LOCAL
- THYROID NEOPLASMS
  - ADENOMA, 5784
  - CARCINOMA, 5784

NEOPLASM REGRESSION, SPONTANEOUS
- KIDNEY NEOPLASMS
  - ADENOCARCINOMA, 5849*
  - CASE REPORT, 5849*
  - HYPERSENSITIVITY, DELAYED, 5849*
  - NEOPLASM METASTASIS, 5849*
- SARCOMA
  - ANTIBODIES, NEOPLASM, 5746

NEOPLASM TRANSPLANTATION
- HELA CELLS

    - CELL MIXTURES, 5776*
  - LEUKEMIA, MYELOBLASTIC
    - A-TYPE PARTICLES, 5657
    - C-TYPE PARTICLES, 5657
    - ULTRASTRUCTURAL STUDY, MOUSE, 5657
  - MELANOMA
    - SUTURES, 5637*
  - NERVOUS SYSTEM NEOPLASMS
    - UREA, 3-ACETYL-1-METHYL-1-NITROSO-, 5587
  - PROSTATIC NEOPLASMS
    - ADENOMA, 5963*
    - CARCINOMA, 5963*
    - IMMUNOSUPPRESSION, 5963*
  - VIRUS, SV40
    - CELL MIXTURES, 5776*

- NEOPLASMS, CONNECTIVE TISSUE
  - BREAST NEOPLASMS
    - HISTOLOGICAL STUDY, 5780
    - ULTRASTRUCTURAL STUDY, 5782
  - NEOPLASMS, MULTIPLE PRIMARY
    - EPIDEMIOLOGY, RAT, 5895*
  - NEOPLASMS, VASCULAR TISSUE
    - ULTRASTRUCTURAL STUDY, 5782
  - SYNOVITIS
    - CASE REPORT, 5839*

- NEOPLASMS, EMBRYONAL AND MIXED
  - BLADDER NEOPLASMS
    - BRACKEN FERN, 5549
    - EPIDEMIOLOGY, CATTLE, 5549
  - FALLOPIAN TUBE NEOPLASMS
    - CASE REPORT, 5824*
  - TESTICULAR NEOPLASMS
    - EPIDEMIOLOGY, 5779
    - HISTOLOGICAL STUDY, 5779

- NEOPLASMS, EXPERIMENTAL
  - ALDEHYDES
    - SULFHYDRYL COMPOUNDS, REVIEW, 5907
  - ANTIGENIC DETERMINANTS
    - HYBRID CELLS, 5764*
  - DRUGS
    - EPIDEMIOLOGY, REVIEW, 5481*
  - HEPATOMA
    - ARTERIAL RESISTANCE, 5477
  - HISTOCOMPATIBILITY ANTIGENS
    - HYBRID CELLS, 5764*
  - HYBRID CELLS
    - ANTIGENIC DETERMINANTS, 5450
    - CHROMOSOMES, 5450
    - HISTOCOMPATIBILITY ANTIGENS, 5450
    - TRANSPLANTATION IMMUNOLOGY, 5764*
  - LYSINE, EPSILON-N-TRIMETHYL-
    - MITOSIS, 5935*
    - NUCLEIC ACIDS, 5935*
    - ULTRASTRUCTURAL STUDY, 5935*
  - PROTEINS
    - SULFHYDRYL COMPOUNDS, REVIEW, 5907
  - SARCOMA, RETICULUM CELL
    - ARTERIAL RESISTANCE, 5477
  - VIRUS, MAREK'S DISEASE HERPES
    - BINDING, 5641
  - VIRUS, MURINE MAMMARY TUMOR
    - REVERSE TRANSCRIPTASE, 5663
    - RNA, VIRAL, 5663
  - VIRUS, RAUSCHER MURINE LEUKEMIA
    - REVERSE TRANSCRIPTASE, 5663
    - RNA, VIRAL, 5663
  - VIRUS, SIMIAN SARCOMA
    - REVERSE TRANSCRIPTASE, 5663
    - RNA, VIRAL, 5663

- NEOPLASMS (GENERAL AND UNSPECIFIED)
  - SEE ALSO UNDER PARTICULAR SITE
  - AMINO ACIDS
    - RNA REPLICATION, 5977*
  - ANIMALS, LABORATORY
    - EPIDEMIOLOGY, REVIEW, 5543*
  - ANTIGENIC DETERMINANTS
    - MACROPHAGE ELECTROPHORETIC MOBILITY TEST, 5743
  - ANTINEOPLASTIC AGENTS
    - CARCINOGENIC POTENTIAL, REVIEW, 5408
  - CARCINOGEN, CHEMICAL
    - NOMENCLATURE SYSTEM, 5477
    - REVIEW, 5402
  - CARCINOGEN, ENVIRONMENTAL
    - EPIDEMIOLOGY, REVIEW, 5542*
  - CELL DIFFERENTIATION
    - CELLS, CULTURED, REVIEW, 5934*
  - CHLOROFORM
    - WATER POLLUTANTS, CHEMICAL, 5897
  - CHROMATIN
    - ISOLATION AND CHARACTERIZATION, REVIEW, 5473
  - CHROMOSOME ABERRATIONS
    - BINDING STUDY, REVIEW, 5526*
  - CYCLOHEXIMIDE
    - RNA REPLICATION, 5977*
  - EPIDEMIOLOGY
    - RNA, 5536*
  - FIBRINOGEN
    - THROMBOPLASTIN, 5941*
  - FIBRINOLYSIS
    - THROMBOPLASTIN, 5941*
  - GENETICS
    - CHROMOSOME ABERRATIONS, REVIEW, 5453
    - RISK-FACTOR ANALYSIS, 5878
  - GROWTH
    - REVIEW, 5402
  - INCIDENCE RATES
    - EPIDEMIOLOGY, REVIEW, 5541*
  - T-LYMPHOCYTES
    - NUCLEOTIDES, CYCLIC, 5757*
    - PROSTAGLANDINS E, 5757*
  - NOMENCLATURE SYSTEM
    - CARCINOGENIC PROCESSES, 5477
  - OCCUPATIONAL HAZARD
    - EPIDEMIOLOGY, 5870
  - ONCOGENIC VIRUSES
    - EPIDEMIOLOGY, REVIEW, 5542*
    - REVIEW, 5434
  - PERSONALITY
    - EPIDEMIOLOGY, 5992*
  - PSYCHOPHYSIOLOGIC DISORDERS
    - REVIEW, 5544*
  - RADIATION, IONIZING
    - CARCINOGENIC POTENTIAL, REVIEW, 5408
    - EPIDEMIOLOGY, REVIEW, 5542*

  - REVIEW, 5429
- SEX FACTORS
  - EPIDEMIOLOGY, ZURICH, 5879
- SMOKING
  - EPIDEMIOLOGY, REVIEW, 5542*
- TRANSPLANTATION, HETEROLOGOUS
  - CORTISONE, 5768*
  - CYCLOPHOSPHAMIDE, 5768*
  - PURINE, 6-((1-METHYL-4-NITROIMIDAZOL-5-YL)THIO)-, 5768*
  - RADIATION, IONIZING, 5768*
  - THYMECTOMY, 5768*
- VIRUS, C-TYPE RNA TUMOR
  - MOUSE, WILD, REVIEW, 5649
- WATER POLLUTANTS, CHEMICAL
  - EPIDEMIOLOGY, 5897*
- WATER POLLUTION
  - EPIDEMIOLOGY, OHIO, 5896*

OPLASMS, MULTIPLE PRIMARY
- CERVIX NEOPLASMS
  - EPIDEMIOLOGY, 5865
- GASTROINTESTINAL NEOPLASMS
  - GENETICS, 5858*
  - POLYPS, 5858*
- LEYDIG CELL TUMOR
  - EPIDEMIOLOGY, RAT, 5895*
- MAMMARY NEOPLASMS, EXPERIMENTAL
  - EPIDEMIOLOGY, RAT, 5895*
- NEOPLASMS, CONNECTIVE TISSUE
  - EPIDEMIOLOGY, RAT, 5895*
- SARCOMA, OSTEOGENIC
  - PLUTONIUM. 5627*
- THYMUS NEOPLASMS
  - EPIDEMIOLOGY, RAT, 5895*
- UROGENITAL NEOPLASMS
  - EPIDEMIOLOGY, 5865
- UTERINE NEOPLASMS
  - EPIDEMIOLOGY, 5865

OPLASMS, VASCULAR TISSUE
- CONTRACEPTIVES, ORAL
  - HISTOLOGICAL STUDY, REVIEW, 5494*
- NEOPLASMS, CONNECTIVE TISSUE
  - ULTRASTRUCTURAL STUDY. 5782

OPLASTIC ENDOCRINE-LIKE SYNDROMES
- ENDOCRINE GLAND NEOPLASMS
  - REVIEW, 5458

PHRITIS, INTERSTITIAL
- UROGENITAL NEOPLASMS
  - EPIDEMIOLOGY, 5893*

RVE GROWTH FACTOR
- NERVOUS SYSTEM NEOPLASMS
  - REGENERATION, 5837*
- NEUROBLASTOMA
  - CELL DIFFERENTIATION, 5965*

RVOUS SYSTEM NEOPLASMS
- ASTROCYTOMA
  - UREA, 3-ACETYL-1-METHYL-1-NITROSO-, 5587
- CELL DIFFERENTIATION
  - CELL TRANSFORMATION, NEOPLASTIC, REVIEW, 5531*
- CELL TRANSFORMATION, NEOPLASTIC
  - ULTRASTRUCTURAL STUDY, MOUSE, RAT, 5860*
- EPENDYMOMA
  - UREA, 3-ACETYL-1-METHYL-1-NITROSO-, 5587
- NERVE GROWTH FACTOR
  - REGENERATION, 5837*
- UREA, 3-ACETYL-1-METHYL-1-NITROSO-
  - NEOPLASM TRANSPLANTATION, 5587
- UREA, ETHYL NITROSO-
  - CELL TRANSFORMATION, NEOPLASTIC, 5860*

NEURAMINIDASE
- LEUKEMIA L1210
  - IMMUNE RESPONSE, 5933*
- MAMMARY NEOPLASMS, EXPERIMENTAL
  - ADENOCARCINOMA, 5745, 5959*
  - TRANSPLANTATION IMMUNOLOGY, 5745
- VIRUS, MURINE MAMMARY TUMOR
  - ANTIGENS, NEOPLASM, 5745

NEUROBLASTOMA
- ACETYLCHOLINESTERASE
  - AZAQUANINE-RESISTANT MUTANTS, 5796
  - THIOGUANINE-RESISTANT MUTANTS, 5796
- ADENOSINE CYCLIC 3',5' MONOPHOSPHATE
  - CELL DIFFERENTIATION, 5965*
- BUTYRIC ACID, SODIUM SALT
  - CARBOXY-LYASES, 5986*
- CATECHOLAMINES
  - AZAQUANINE-RESISTANT MUTANTS, 5796
  - THIOGUANINE-RESISTANT MUTANTS, 5796
- CHILD
  - DIAGNOSIS AND PROGNOSIS, REVIEW, 5459
  - EPIDEMIOLOGY, REVIEW, 5459
- CHROMOSOMES
  - AZAQUANINE-RESISTANT MUTANTS, 5796
  - THIOGUANINE-RESISTANT MUTANTS, 5796
- DIBUTYRYL CYCLIC AMP
  - CARBOXY-LYASES, 5986*
- ISOQUINOLINE, 6,7-DIMETHOXY-1-VERATRYL-
  - CARBOXY-LYASES, 5986*
- NERVE GROWTH FACTOR
  - CELL DIFFERENTIATION, 5965*
- PLANT AGGLUTININS
  - CELL DIFFERENTIATION, 5965*
- THEOPHYLLINE
  - CARBOXY-LYASES, 5986*
- TRANSPLANTATION, HOMOLOGOUS
  - SYNGENEIC MUSCLE SANDWICH GRAFT, 5771*

NEUROFIBROMATOSIS
- LEUKEMIA, MYELOBLASTIC
  - CASE REPORT, 5813*

NEUROMA
- BOWLER'S THUMB
  - CASE REPORT, 5822*

NEUROSPORA CRASSA
- CARCINOGEN, CHEMICAL
  - MUTAGENIC ACTIVITY ASSAY, REVIEW, 5479*
- 4-CYCLOHEXENE-1,2-DICARBOXIMIDE, N-

- (TRICHLOROMETHYL)THIO-
  - MUTAGENIC ACTIVITY, REVIEW, 5420

NEUTRONS
- BLOOD VESSELS
  - ULTRASTRUCTURAL STUDY, RAT, 5626*

NEVUS
- EYE NEOPLASMS
  - MELANOMA, 5462

NICKEL
- ENVIRONMENTAL HAZARD
  - CARCINOGENIC POTENTIAL, REVIEW, 5489*

NITROSAMINES
- CARCINOGENIC ACTIVITY
  - REVIEW, 5409
- DIETHYLAMINE, N-NITROSO-
  - CARCINOGENIC POTENTIAL, FISH, 5577
- LIVER NEOPLASMS
  - CARCINOGENIC ACTIVITY, REVIEW, 5403

NITROSO COMPOUNDS
- ENVIRONMENTAL HAZARD
  - RISK EVALUATION, REVIEW, 5492*
- NUCLEIC ACIDS
  - CELL TRANSFORMATION, NEOPLASTIC, 5411

NITROUS ACID
- DISULFIDE, BIS(DIMETHYLTHIIOCARBAMOYL)-
  - DIMETHYLAMINE, N-NITROSO-, 5574
- DNA
  - REVIEW, 5426
- FOOD CONTAMINATION
  - CHROMATOGRAPHIC STUDY, 5580
- PHOSPHORODIAMIDIC FLUORIDE, TETRAMETHYL-
  - DIMETHYLAMINE, N-NITROSO-, 5574
- UREA, 3-CYCLOOCTYL-1,1-DIMETHYL-
  - DIMETHYLAMINE, N-NITROSO-, 5574
- UREA, 3-(P-(P-CHLOROPHENOXY)PHENYL)-1, 1-DIMETHYL-
  - DIMETHYLAMINE, N-NITROSO-, 5574

NOGALAMYCIN
- LEUKOCYTES
  - CHROMOSOME ABERRATIONS, 5613*
- SPERMATOGENESIS
  - RAT, 5613*
- SPERMATOZOA
  - CHROMOSOME ABERRATIONS, 5613*

NUCLEIC ACIDS
- BLADDER NEOPLASMS
  - CARCINOMA, TRANSITIONAL CELL, 5937*
- CARCINOMA, TRANSITIONAL CELL
  - CELL CYCLE KINETICS, 5937*
- DIMETHYLAMINE, N-NITROSO-
  - KIDNEY, RAT, 5609*
- NEOPLASMS, EXPERIMENTAL
  - LYSINE, EPSILON-N-TRIMETHYL-, 5935*
- NITROSO COMPOUNDS
  - CELL TRANSFORMATION, NEOPLASTIC, 5411
- ONCOGENIC VIRUSES
  - MIXED INFECTIONS, REVIEW, 5435
- UTERINE NEOPLASMS
  - ESTRADIOL, 5951*
  - PROGESTERONE, 5951*

NUCLEOPROTEINS
- CARCINOMA
  - RNA, 5998*
- COLON
  - CELL TRANSFORMATION, NEOPLASTIC, 5990*
- COLONIC NEOPLASMS
  - HYDRAZINE, 1,2-DIMETHYL-, 5990*
- DIMETHYLAMINE, N,ALPHA-ACETOXY-N-NITROSO-
  - DIMETHYLAMINE, N-NITROSO-, 5575
- DROSOPHILA MELANOGASTER
  - DIMETHYLAMINE, N-NITROSO-, 5575
- RADIATION, IONIZING
  - CELL CYCLE KINETICS, 5634*
- RNA
  - ISOLATION AND CHARACTERIZATION, 5998*

NUCLEOSIDES
- HELA CELLS
  - METABOLISM, 5911
- VIRUS, ROUS SARCOMA
  - METABOLISM, 5645
  - TEMPERATURE SENSITIVE MUTANTS, 5645

NUCLEOTIDASES
- DNA REPLICATION
  - LIVER REGENERATION, 5994*
- ESTRADIOL
  - PITUITARY GLAND, RAT, 5956*
- THYMOMA
  - CELL MEMBRANE, 5979*

NUCLEOTIDES
- ALKALINE PHOSPHATASE
  - LIVER REGENERATION, 5997*
- LEUKEMIA, LYMPHOBLASTIC
  - RNA, TRANSFER, 5989*
- LEUKEMIA, MYELOBLASTIC
  - RNA, TRANSFER, 5989*
- LEUKEMIA, MYELOCYTIC
  - RNA, TRANSFER, 5989*
- LIVER REGENERATION
  - ISOLATION AND CHARACTERIZATION, 5997*
- VIRUS, AVIAN SARCOMA
  - DNA, VIRAL, 5643

NUCLEOTIDES, CYCLIC
- BREAST NEOPLASMS
  - LYMPHOCYTES, 5758*
- HEAD AND NECK NEOPLASMS
  - CARCINOMA, EPIDERMOID, 5758*
  - LYMPHOCYTES, 5758*
- HEPATOMA
  - ENDOPLASMIC RETICULUM, 5912
- MELANOMA
  - LYMPHOCYTES, 5758*
- NEOPLASM METASTASIS

- B-LYMPHOCYTES, 5757*
- NEOPLASMS
    - T-LYMPHOCYTES, 5757*

N
- MELANOMA
    - SUTURES, 5637*

PATIONAL HAZARD
- BLADDER NEOPLASMS
    - EPIDEMIOLOGY, REVIEW, 5488*
- BRONCHITIS
    - FIBROUS GLASS, 5869
- ETHYLENE, CHLORO-
    - EPIDEMIOLOGY, ENGLAND, 5871
- GASTROINTESTINAL NEOPLASMS
    - EPIDEMIOLOGY, REVIEW, 5486*
- LUNG NEOPLASMS
    - ASBESTOSIS, 5802
    - EPIDEMIOLOGY, 5870
    - EPIDEMIOLOGY, REVIEW, 5486*
- MESOTHELIOMA
    - EPIDEMIOLOGY, REVIEW, 5486*
- NEOPLASMS
    - EPIDEMIOLOGY, 5870
- PNEUMOCONIOSIS
    - EPIDEMIOLOGY, REVIEW, 5486*
- RESPIRATORY TRACT NEOPLASMS
    - FIBROUS GLASS, 5869

TADECENOIC ACID
- SKIN NEOPLASMS
    - BENZO(A)PYRENE, 5568

ONUCLEOTIDES
- VIRUS, ENCEPHALOMYOCARDITIS
    - RNA, VIRAL, 5720*
- VIRUS, FOOT AND MOUTH DISEASE
    - RNA, VIRAL, 5720*
- VIRUS, PICORNA
    - RNA, VIRAL, 5720*
- VIRUS, POLIO
    - RNA, VIRAL, 5720*
- VIRUS, ROUS SARCOMA
    - DNA, VIRAL, 5647
- VIRUS, VESICULAR STOMATITIS
    - RNA, VIRAL, 5720*

OGENIC VIRUSES
- ANTIGENIC DETERMINANTS
    - VIRUS REPLICATION, REVIEW, 5518*
- CARCINOGEN, CHEMICAL
    - COCARCINOGENESIS, REVIEW, 5490*
- CARCINOMA, BRONCHIOLAR
    - CELL TRANSFORMATION, NEOPLASTIC, REVIEW, 5406
- CELL MEMBRANE
    - CELL TRANSFORMATION, NEOPLASTIC, REVIEW, 5443
- CELLS, CULTURED
    - CELL TRANSFORMATION, NEOPLASTIC, REVIEW, 5434
- CHROMOSOME ABERRATIONS
    - CELL TRANSFORMATION, NEOPLASTIC, REVIEW, 5453
- CLASSIFICATION AND NOMENCLATURE
    - REVIEW, 5521*
- CORYNEBACTERIUM PARVUM
    - IMMUNOTHERAPY, REVIEW, 5522*
- LEUKEMIA
    - RADIATION EFFECTS, REVIEW, 5497*
- LYMPHOMA
    - BLOOD COAGULATION, 5676
    - HEMOSTASIS, 5676
- MELANOMA
    - DNA-RNA HYBRIDIZATION, 5718*
- MYCOBACTERIUM BOVIS
    - IMMUNOTHERAPY, REVIEW, 5522*
- NEOPLASMS
    - EPIDEMIOLOGY, REVIEW, 5542*
    - REVIEW, 5434
- NUCLEIC ACIDS
    - MIXED INFECTIONS, REVIEW, 5435
- PHENOTYPIC MIXING
    - MIXED INFECTIONS, REVIEW, 5435
- RETINOBLASTOMA
    - RISK FACTORS, 5536*
- REVERSE TRANSCRIPTASE
    - ISOLATION AND CHARACTERIZATION, REVIEW, 5518*
- VIRAL PROTEINS
    - MIXED INFECTIONS, REVIEW, 5435
- VIRAL VACCINES
    - IMMUNOTHERAPY, REVIEW, 5522*

ORBITAL NEOPLASMS
- HEMANGIOENDOTHELIOMA
    - CELL DIFFERENTIATION, 5795
    - ULTRASTRUCTURAL STUDY, 5795
- HEMANGIOPERICYTOMA
    - CELL DIFFERENTIATION, 5795
    - ULTRASTRUCTURAL STUDY, 5795
- RHABDOMYOSARCOMA
    - CASE REPORT, CHILD, 5886*
    - ULTRASTRUCTURAL STUDY, 5886*

ORGANOIDS
- LIVER NEOPLASMS
    - BENZENAMINE, N,N-DIMETHYL-4-((3-METHYLPHENYL)AZO)-, 5547

OVALBUMIN
- ESTRADIOL
    - OVIDUCTS, CHICK, 5922
- PROGESTERONE
    - OVIDUCTS, CHICK, 5922
- 4,4'-STILBENEDIOL, ALPHA,ALPHA'-DIETHYL-
    - OVIDUCTS, CHICK, 5922

OVARIAN NEOPLASMS
- ARRHENOBLASTOMA
    - CASE REPORT, 5778
    - HISTOLOGICAL STUDY, 5778
- CARCINOMA
    - EPIDEMIOLOGY, CZECHOSLOVAKIA, 5867
- CYSTADENOMA
    - DIAGNOSIS AND TREATMENT, 5533*
- CYSTADENOMA, MUCINOUS
    - DIAGNOSIS AND TREATMENT, 5533*
- DISGERMINOMA
    - DIAGNOSIS AND TREATMENT, 5533*
- HYPERSENSITIVITY, DELAYED
    - IMMUNITY, CELLULAR, 5737
- LYMPHOCYTE TRANSFORMATION
    - PLANT AGGLUTININS, 5737
- MESENCHYMOMA
    - DIAGNOSIS AND TREATMENT, 5533*

- PLANT AGGLUTININS
    - IMMUNITY, CELLULAR, 5737
- PRECANCEROUS CONDITIONS
    - DIAGNOSIS AND TREATMENT, 5533*
- TERATOID TUMOR
    - DIAGNOSIS AND TREATMENT, 5533*

2-OXETANONE
- HELA CELLS
    - DNA REPAIR, 5586

OXIDOREDUCTASES
- BARBITURIC ACID, 5-ETHYL-5-PHENYL-
    - MUTAGENIC ACTIVITY, REVIEW, 5421
- ETHYLENE, CHLORO-
    - MUTAGENIC ACTIVITY, REVIEW, 5421
- GLYCINONITRILE
    - MUTAGENIC ACTIVITY, REVIEW, 5421
- HEPATOMA
    - CATALASE, 5971*
    - CELLS, CULTURED, 5971*
- LEUKEMIA L1210
    - AMINOPTERIN, 5980*
    - INHIBITION KINETICS, 5980*
    - METHOTREXATE, 5980*
    - METHOTREXATE, DICHLORO-, 5980*
- MAMMAE
    - CELLS, CULTURED, 5972*

OXIDOREDUCTASES, N-DEMETHYLATING
- DIMETHYLAMINE, N-NITROSO-
    - AGE FACTORS, 5573
    - CHOLANTHRENE, 3-METHYL-, 5573

PALMITATES
- SKIN NEOPLASMS
    - CO-CARCINOGENS, REVIEW, 5404

PANCREATIC NEOPLASMS
- ADENOCARCINOMA
    - THORIUM DIOXIDE, 5625
- SMOKING
    - EPIDEMIOLOGY, REVIEW, 5480*
- THORIUM DIOXIDE
    - CASE REPORT, 5625
    - RETENTION, SPLEEN AND LIVER, 5625

PANCREATITIS
- CARCINOEMBRYONIC ANTIGEN
    - SERUM LEVELS, 5753*

PAPAIN
- MAMMARY NEOPLASMS, EXPERIMENTAL
    - ADENOCARCINOMA, 5959*

PAPILLOMA
- BLADDER NEOPLASMS
    - BRACKEN FERN, 5549
    - EPIDEMIOLOGY, CATTLE, 5549
- GALLBLADDER NEOPLASMS
    - CASE REPORT, 5861*
    - HISTOLOGICAL STUDY, 5861*

PARALYSIS
- VIRUS, C-TYPE RNA TUMOR
    - MOUSE, WILD, REVIEW, 5649

PARATHYROID NEOPLASMS
- ADENOMA
    - CASE REPORT, 5844*
- THYROID NEOPLASMS
    - CASE REPORT, 5844*

PEPTIDE HYDROLASES
- DIETHYLAMINE, N-NITROSO-
    - LIVER, RAT, 5608*
- DIPROPYLAMINE, N-NITROSO-
    - LIVER, RAT, 5608*
- LYMPHOSARCOMA
    - PLANT AGGLUTININS, BINDING, 5958*

PEPTIDES
- CELL MEMBRANE
    - ISOLATION AND CHARACTERIZATION, 5908
- MICROSOMES, LIVER
    - CELL MEMBRANE, 5908
- VIRUS, ADENO 2
    - ISOLATION AND CHARACTERIZATION, 5683
- VIRUS, HERPES SIMPLEX
    - VIRUS REPLICATION, REVIEW, 5437
- VIRUS, RAUSCHER MURINE LEUKEMIA
    - RNA, VIRAL, 5661

PEROXIDASES
- CONCANAVALIN A
    - CELL MEMBRANE, 5909

PHENETHYLAMINE, N-BENZYL-N,ALPHA-DIMETHY
- HEPATOMA
    - CYTOCHROME P-450, 5601*
    - CYTOCHROME REDUCTASES, 5601*
    - HYDROXYLATION, 5601*
    - LECITHINS, 5601*

PHEOCHROMOCYTOMA
- GENETICS
    - CASE REPORT, 5785
- THYROID NEOPLASMS
    - CASE REPORT, 5785
    - GENETICS, 5785
    - GLUCOSEPHOSPHATE DEHYDROGENASE, 5785

PHORBOL
- SKIN NEOPLASMS
    - CO-CARCINOGENS, REVIEW, 5404

PHORBOL MYRISTATE ACETATE
- SEE 12-O-TETRADECANOYLPHORBOL-13-ACETATE

PHOSPHODIESTERASES
- BREAST NEOPLASMS
    - CARCINOMA, 5820*
- CALCIUM
    - CELL TRANSFORMATION, NEOPLASTIC, 5987*
- CELL TRANSFORMATION, NEOPLASTIC
    - EMBRYO, MOUSE, 5987*
- MAGNESIUM
    - CELL TRANSFORMATION, NEOPLASTIC 5987*
- MANGANESE
    - CELL TRANSFORMATION, NEOPLASTIC 5987*
- THEOPHYLLINE

- CELL TRANSFORMATION, NEOPLASTIC, 5987*
- THYMOMA
  - CELL MEMBRANE, 5979*
- VIRUS, ROUS SARCOMA
  - CELL TRANSFORMATION, NEOPLASTIC, 5644

HOSPHOFRUCTOKINASE
- VIRUS, MURINE SARCOMA
  - CELL TRANSFORMATION, NEOPLASTIC, 5662
  - CONTACT INHIBITION, 5662

HOSPHOGLUCONATE DEHYDROGENASE
- VIRUS, MURINE SARCOMA
  - CELL TRANSFORMATION, NEOPLASTIC, 5662
  - CONTACT INHIBITION, 5662

HOSPHOLIPIDS
- CELL MEMBRANE
  - ISOLATION AND CHARACTERIZATION, 5908
- CERVIX NEOPLASMS
  - ISOLATION AND CHARACTERIZATION, 5940*
  - SUBCELLULAR FRACTIONS, 5940*
- MICROSOMES, LIVER
  - CELL MEMBRANE, 5908

HOSPHOPROTEINS
- HEPATOMA
  - ADENOSINE CYCLIC 3',5' MONOPHOSPHATE, 5913
  - ENDOPLASMIC RETICULUM, 5913
- PROLACTIN
  - BREAST, 5560

HOSPHORODIAMIDIC FLUORIDE, TETRAMETHYL-
- NITROUS ACID
  - DIMETHYLAMINE, N-NITROSO-, 5574

HOSPHOTRANSFERASES
- THYROID NEOPLASMS
  - ADENOCARCINOMA, 5915
  - ADENOSINE CYCLIC 3',5 MONOPHOSPHATE, 5915
  - CARCINOMA, PAPILLARY, 5915

HOSPHOTRANSFERASES, ATP
- GUANIDINE, 1-METHYL-3-NITRO-1-NITROSO-
  - GENETICS, 5638*
  - MUTAGENIC ACTIVITY, OVARY, HAMSTER, 5638*
- MAMMAE
  - CELLS, CULTURED, 5972*
- ULTRAVIOLET RAYS
  - GENETICS, 5638*
  - MUTAGENIC ACTIVITY, OVARY, HAMSTER, 5638*

PHTHALIMIDE, N-((TRICHLOROMETHYL)THIO)-
- RODENTS
  - MUTAGENIC ACTIVITY, REVIEW, 5420

PHYTOHEMAGGLUTININ
- SEE PLANT AGGLUTININS

PIGMENTATION
- MELANOMA
  - ADENOSINE CYCLIC 3',5' MONOPHOSPHATE, 5835*
  - CARCINOGENIC POTENTIAL, 5835*

PIPERIDINE, 1-NITROSO-
- FOOD CONTAMINATION
  - CHROMATOGRAPHIC STUDY, 5580

PITUITARY GLAND
- CELL DIFFERENTIATION
  - GONADECTOMY, MOUSE, 5781

PITUITARY HORMONES
- PROLACTIN
  - REVEIW, 5469

PITUITARY NEOPLASMS
- ACROMEGALY
  - CELLULAR INCLUSIONS, 5783
  - DNA, 5783
  - ULTRASTRUCTURAL STUDY, 5783
- ADENOMA
  - CELLULAR INCLUSIONS, 5783
  - ERGOLINES, 5843*
  - LACTATION DISORDERS, 5842*
  - ULTRASTRUCTURAL STUDY, 5842*
- ADENOMA, CHROMOPHOBE
  - CELLULAR INCLUSIONS, 5783
  - ULTRASTRUCTURAL STUDY, 5842*
- 5ALPHA-ANDROSTAN-3-ONE, 17BETA-HYDROXY-
  - GROWTH, 5552
- CATECHOLAMINES
  - PROLACTIN, 5955*
- CORTISOL
  - GROWTH, 5552
- CORTISOL ACETATE
  - GROWTH, 5552
- ERGOLINES
  - PROLACTIN, 5843*
  - ULTRASTRUCTURAL STUDY, 5843*
- ESTRADIOL
  - GROWTH, 5552
  - IMIDAZOLE-2-THIOL, 1-METHYL-, 5553
  - URACIL, 6-PROPYL-2-THIO-, 5553
- ESTROGENS
  - GROWTH, 5552, 5554
- IMIDAZOLE-2-THIOL, 1-METHYL-
  - GROWTH, 5553
- PROGESTERONE
  - GROWTH, 5552
- PROLACTIN
  - CASE REPORT, 5843*
- PYROCATECHOL, 4-(2-AMINOETHYL)-
  - PROLACTIN, 5955*
- SOMATOTROPIN
  - SERUM LEVELS, 5552
- TESTOSTERONE
  - GROWTH, 5552
- THYROXINE
  - GROWTH, 5554
  - URACIL, 6-PROPYL-2-THIO-, 5553
- TRIIODOTHYRONINE
  - GROWTH, 5554
  - URACIL, 6-PROPYL-2-THIO-, 5553
- URACIL, 6-PROPYL-2-THIO-
  - GROWTH, 5553

- PLACENTA
  - ALKALINE PHOSPHATASE
    - ISOLATION AND CHARACTERIZATION, 5988*
  - CADMIUM
    - SPECTROPHOTOMETRIC STUDY, 5887*
  - VIRUS-LIKE PARTICLES
    - C-TYPE PARTICLES, 5648
    - ULTRASTRUCTURAL STUDY, RAT, 5648

- PLANT AGGLUTININS
  - ADENOSINE CYCLIC 3',5' MONOPHOSPHATE
    - LYMPHOCYTE TRANSFORMATION, 5730
  - LEUKEMIA, LYMPHOBLASTIC
    - LYMPHOCYTE TRANSFORMATION, 5884
  - LEUKEMIA, MYELOBLASTIC
    - LYMPHOCYTE TRANSFORMATION, 5884
  - LYMPHOSARCOMA
    - BINDING, 5958*
  - NEUROBLASTOMA
    - CELL DIFFERENTIATION, 5965*
  - OVARIAN NEOPLASMS
    - IMMUNITY, CELLULAR, 5737
    - LYMPHOCYTE TRANSFORMATION, 5737
  - VIRUS, AVIAN LEUKOSIS
    - LYMPHOCYTE TRANSFORMATION, 5701*

- PLASMACYTOMA
  - CYCLOPHOSPHAMIDE
    - FACTOR XIII, 5945*
  - CYTOSOL
    - PROTEIN KINASE, 5914
  - FACTOR XIII
    - SERUM LEVELS, 5945*
  - HEAVY CHAIN DISEASE
    - CASE REPORT, 5751
  - INTESTINAL NEOPLASMS
    - CASE REPORT, 5751
    - HEAVY CHAIN DISEASE, 5751
    - IMMUNOPEROXIDASE STUDY, 5751
  - PROTEIN KINASE
    - ISOLATION AND CHARACTERIZATION, 5914
    - RIBOSOMAL PROTEINS, 5914
  - RIBOSOMES
    - PROTEIN KINASE, 5914

- PLASMINOGEN
  - ISOQUINOLINE, 6,7-DIMETHOXY-1-VERATRYL-
    - OVARY, HAMSTER, 5918
  - PROSTAGLANDINS E
    - OVARY, HAMSTER, 5918
  - THEOPHYLLINE
    - OVARY, HAMSTER, 5918

- PLASMODIUM
  - MYXOMYCETES
    - CELL CYCLE KINETICS, 5904
    - CELL DIVISION, 5904

- PLUTONIUM
  - LUNG NEOPLASMS
    - ADENOMA, 5627*
    - CARCINOMA, BRONCHIOLAR, 5627*
    - PARTICLE RETENTION, REVIEW, 5502*
    - TISSUE DISTRIBUTION, DOG, 5627*
  - LYMPH NODES
    - CARCINOGENIC ACTIVITY, REVIEW, 5502*
    - LUNG, REVIEW, 5502*
  - SARCOMA, OSTEOGENIC
    - EPIDEMIOLOGY, DOG, 5627*
    - HISTOLOGICAL STUDY, DOG, 5627*
    - NEOPLASMS, MULTIPLE PRIMARY, 5627*
  - SKELETON
    - TISSUE DISTRIBUTION, DOG, 5627*

- PNEUMOCONIOSIS
  - ASBESTOS
    - EPIDEMIOLOGY, REVIEW, 5486*
  - OCCUPATIONAL HAZARD
    - EPIDEMIOLOGY, REVIEW, 5486*

- POLY A
  - RNA REPLICATION
    - EMBRYO, MOUSE, 5711*
  - VIRUS, ADENO 2
    - RNA, MESSENGER, 5685
  - VIRUS, PICORNA
    - RNA, VIRAL, 5720*

- POLY U
  - MAMMARY NEOPLASMS, EXPERIMENTAL
    - TRYPSIN, 5959*

- POLYCYCLIC HYDROCARBONS
  - ARYL HYDROCARBON HYDROXYLASES
    - EPITHELIAL CELLS, 5548
  - CARCINOGENIC METABOLITE
    - ISOLATION AND CHARACTERIZATION, 5564
  - CELL TRANSFORMATION, NEOPLASTIC
    - EMBRYO, MOUSE, 5614*
  - ENVIRONMENTAL HAZARD
    - RISK EVALUATION, REVIEW, 5492*
  - FREE RADICALS
    - CELL TRANSFORMATION, NEOPLASTIC, 5410
  - K-REGION EPOXIDES
    - ISOLATION AND CHARACTERIZATION, 5564
  - LIVER NEOPLASMS
    - CARCINOGENIC ACTIVITY, REVIEW, 5403
  - URIDINE, 2'-DEOXY-5-IODO-
    - CELL TRANSFORMATION, NEOPLASTIC, 5614*
  - VIRUS, C-TYPE RNA TUMOR
    - VIRUS REPLICATION, 5614*
  - VIRUS, MURINE LEUKEMIA
    - CELL TRANSFORMATION, NEOPLASTIC, 5614*
    - VIRUS REPLICATION, 5614*

- POLYCYTHEMIA VERA
  - LEUKEMIA
    - EPIDEMIOLOGY, REVIEW, 5454
  - MYELOID METAPLASIA
    - EPIDEMIOLOGY, REVIEW, 5454

- POLYGLYCOLIC ACID
  - MELANOMA
    - SUTURES, 5637*

- POLYPS
  - GASTROINTESTINAL NEOPLASMS
    - GENETICS, 5858*

    - NEOPLASMS, MULTIPLE PRIMARY, 5858*
  - SEBACEOUS CYST
    - GENETICS, 5829*

PRACTOLOL
  - HEPATOMA
    - ADENYL CYCLASE, 5957*

PRECANCEROUS CONDITIONS
  - BREAST NEOPLASMS
    - ELASTIC TISSUE, 5780
    - ENZYMATIC ACTIVITY, 5820*
  - CARCINOMA
    - CELLS, CULTURED, 5808*
  - CERVIX NEOPLASMS
    - CONTRACEPTIVES, ORAL, 5868
    - GLYCOGEN, 5799
    - GLYCOGEN PHOSPHORYLASE, 5799
    - GLYCOGEN SYNTHETASE, 5799
    - REVIEW, 5436
  - LARYNGEAL NEOPLASMS
    - HISTOLOGICAL STUDY, 5854*
  - LEUKEMIA, LYMPHOBLASTIC
    - EPIDEMIOLOGY, ADULT, 5883
  - LEUKEMIA, LYMPHOCYTIC
    - EPIDEMIOLOGY, ADULT, 5883
  - LEUKEMIA, MYELOBLASTIC
    - EPIDEMIOLOGY, ADULT, 5883
  - LEUKEMIA, MYELOCYTIC
    - EPIDEMIOLOGY, ADULT, 5883
  - LIVER NEOPLASMS
    - ACETAMIDE, N-FLUOREN-2-YL-, 5579
    - BUTYRIC ACID, 2-AMINO-4-(ETHYLTHIO)-, 5579
    - DIETHYLAMINE, N-NITROSO-, 5579
    - DIMETHYLAMINE, N-NITROSO-, 5579
    - REVIEW, 5405
    - M-TOLUIDINE, N,N-DIMETHYL-4-(PHENYLAZO)-, 5579
  - MAMMARY NEOPLASMS, EXPERIMENTAL
    - BENZOIC ACID, P-AMINO-, 2-(DIETHYLAMINO)ETHYL ESTER, 5561
    - CORTISOL, 5561
    - INSULIN, 5561
    - PROLACTIN, 5561
  - OVARIAN NEOPLASMS
    - DIAGNOSIS AND TREATMENT, 5533*
  - SKIN NEOPLASMS
    - REVIEW, 5789

PROGESTERONE
  - ENDOMETRIUM
    - ULTRASTRUCTURAL STUDY, RABBIT, 5953*
  - ESTRADIOL
    - HISTOLOGICAL SUTDY, 5951*
  - OVALBUMIN
    - OVIDUCTS, CHICK, 5922
  - PITUITARY NEOPLASMS
    - GROWTH, 5552
  - RNA, MESSENGER
    - OVIDUCTS, CHICK, 5922
  - RNA POLYMERASE
    - OVIDUCTS, CHICK, 5922
  - UTERINE NEOPLASMS
    - HISTOLOGICAL SUTDY, 5951*
    - NUCLEIC ACIDS, 5951*

PROLACTIN
  - BREAST
    - CELL DIVISION, 5560
    - DNA REPLICATION, 5560
    - PHOSPHOPROTEINS, 5560
    - ULTRASTRUCTURAL STUDY, 5560
  - ESTRADIOL
    - PITUITARY GLAND, RAT, 5956*
  - MAMMARY NEOPLASMS, EXPERIMENTAL
    - PRECANCEROUS CONDITIONS, 5561
  - PITUITARY HORMONES
    - REVEIW, 5469
  - PITUITARY NEOPLASMS
    - CASE REPORT, 5843*
    - CATECHOLAMINES, 5955*
    - ERGOLINES, 5843*
    - PYROCATECHOL, 4-(2-AMINOETHYL)-, 5955*
  - TESTOSTERONE
    - METABOLISM, 5559
    - PROSTATE, RAT, 5559

PROLINE HYDROXYLASE
  - MAMMARY NEOPLASMS, EXPERIMENTAL
    - ADENOCARCINOMA, 5938*

PRONASE
  - MAMMARY NEOPLASMS, EXPERIMENTAL
    - ADENOCARCINOMA, 5959*

1-PROPANONE, 2-METHYL-1,2-DI-3-PYRIDYL-, TARTRATE
  - HYDROXYLASES
    - GENETICS, MOUSE, 5571

PROPIONIC ACID, 2-(P-CHLOROPHENOZY)-2-METHYL-, ETHYL ESTER
  - LIVER NEOPLASMS
    - BENZENAMINE, N,N-DIMETHYL-4-((3-METHYLPHENYL)AZO)-, 5547

PROSTAGLANDINS
  - CELL CYCLE KINETICS
    - REVIEW, 5474

PROSTAGLANDINS E
  - CELL MEMBRANE
    - CELL DIFFERENTIATION, 5507*
  - GALACTOSE
    - CELL TRANSFORMATION, NEOPLASTIC, 5939*
  - NEOPLASM METASTASIS
    - B-LYMPHOCYTES, 5757*
  - NEOPLASMS
    - T-LYMPHOCYTES, 5757*
  - PLASMINOGEN
    - OVARY, HAMSTER, 5918
  - THYROID NEOPLASMS
    - ADENYL CYCLASE, 5915

PROSTATIC NEOPLASMS
  - ADENOMA
    - NEOPLASM TRANSPLANTATION, 5963*
  - CARCINOMA
    - CLASSIFICATION, 5777
    - NEOPLASM METASTASIS, 5777
    - NEOPLASM TRANSPLANTATION, 5963*
  - IMMUNOSUPPRESSION
    - NEOPLASM TRANSPLANTATION, 5963*

- PROTEIN KINASE
  - BREAST NEOPLASMS
    - CARCINOMA, 5820*
  - CARCINOMA, EHRLICH TUMOR
    - ISOLATION AND CHARACTERIZATION, 5995*
  - HEPATOMA
    - ADENOSINE CYCLIC 3',5' MONOPHOSPHATE, 5913
    - ENDOPLASMIC RETICULUM, 5913
    - HISTONES, 5913
    - ISOLATION AND CHARACTERIZATION, 5995*
  - PLASMACYTOMA
    - CYTOSOL, 5914
    - ISOLATION AND CHARACTERIZATION, 5914
    - RIBOSOMAL PROTEINS, 5914
    - RIBOSOMES, 5914

- PROTEINS
  - CELL MEMBRANE
    - CELL TRANSFORMATION, NEOPLASTIC, REVIEW, 5960*
  - HEPATOMA
    - CELL SUSPENSION, REVIEW, 5475
    - RNA, 6000*
  - LIVER CIRRHOSIS
    - ALPHA 1 ANTITRYPSIN, 5852*
  - LIVER NEOPLASMS
    - ALPHA 1 ANTITRYPSIN, 5852*
  - LUNG NEOPLASMS
    - ALPHA 1 ANTITRYPSIN, 5852*
  - MAMMAE
    - CELLS, CULTURED, 5972*
  - NEOPLASMS, EXPERIMENTAL
    - SULFHYDRYL COMPOUNDS, REVIEW, 5907
  - PULMONARY EMPHYSEMA
    - ALPHA 1 ANTITRYPSIN, 5852*
  - RADIATION, IONIZING
    - DNA, BACTERIAL, 5427
  - ULTRAVIOLET RAYS
    - DNA, BACTERIAL, 5427
  - VIRUS, ROUS SARCOMA
    - CELL TRANSFORMATION, NEOPLASTIC, 5644
  - VIRUS, SV40
    - CHROMOSOMES, 5672

- PSEUDOPODIA
  - CARCINOMA, BASAL CELL
    - ULTRASTRUCTURAL STUDY, 5836*

- PSYCHOPHYSIOLOGIC DISORDERS
  - NEOPLASMS
    - REVIEW, 5544*

- PULMONARY EMPHYSEMA
  - ALPHA 1 ANTITRYPSIN
    - PROTEINS, 5852*

- PURINE, 6-((1-METHYL-4-NITROIMIDAZOL-5-YL) THIO)-
  - NEOPLASMS
    - TRANSPLANTATION, HETEROLOGOUS, 5768*

- PURINE-6-THIOL
  - LEUKEMIA
    - CHROMOSOME ABERRATIONS, 5805
    - DNA REPLICATION, 5805

- PURINES
  - HEPATOMA
    - METABOLISM, REVIEW, 5478

- PUROMYCIN
  - MULTIPLE MYELOMA
    - IMMUNOGLOBULINS, LIGHT CHAIN, 5727

- PYRENE
  - SKIN NEOPLASMS
    - BENZO(A)PYRENE, 5568

- PYRIMIDINES
  - BLADDER NEOPLASMS
    - CARCINOMA, TRANSITIONAL CELL, 5937*
  - CARCINOMA, TRANSITIONAL CELL
    - CELL CYCLE KINETICS, 5937*
  - HEPATOMA
    - METABOLISM, REVIEW, 5478

- PYROCATECHOL
  - SKIN NEOPLASMS
    - BENZO(A)PYRENE, 5568

- PYROCATECHOL, 4-(2-AMINOETHYL)-
  - PITUITARY NEOPLASMS
    - PROLACTIN, 5955*

- PYROGALLOL
  - SKIN NEOPLASMS
    - BENZO(A)PYRENE, 5568

- PYRROLIDINE, 1-NITROSO-
  - FOOD CONTAMINATION
    - CHROMATOGRAPHIC STUDY, 5580

- QUINOLINE, 4-NITRO-, 1-OXIDE
  - CELL TRANSFORMATION, NEOPLASTIC
    - REVIEW, 5425

- RADIATION, IONIZING
  - ARYL HYDROCARBON HYDROXYLASES
    - MOUSE, 5640*
  - BONE NEOPLASMS
    - HISTOLOGICAL STUDY, REVIEW, 5491
  - BREAST NEOPLASMS
    - CARCINOMA, DUCTAL, 5499*
    - DOSE-RESPONSE STUDY, REVIEW, 549
    - EPIDEMIOLOGY, REVIEW, 5499*
  - CARCINOMA, BRONCHIOLAR
    - CELL TRANSFORMATION, NEOPLASTIC, REVIEW, 5406
  - CELL SURVIVAL
    - FIBROBLASTS, CHICKEN, 5632*
    - FIBROBLASTS, MOUSE, 5632*
  - CHOLANTHRENE, 3-METHYL-
    - ARYL HYDROCARBON HYDROXYLASES, 5640*
  - CHROMOSOME ABERRATIONS
    - CELL TRANSFORMATION, NEOPLASTIC, REVIEW, 5453
  - DNA, BACTERIAL
    - PROTEINS, 5427
  - DNA REPLICATION
    - CELL CYCLE KINETICS, 5634*

    - FIBROBLASTS, HAMSTER OVARY, 5634*
  - ENDOCRINE GLAND NEOPLASMS
    - CARCINOGENIC POTENTIAL, REVIEW, 5430
  - ESCHERICHIA COLI
    - DNA REPAIR, 5427
  - HELA CELLS
    - CELL MIXTURES, 5776*
  - LEUKEMIA
    - CARCINOGENIC POTENTIAL, REVIEW, 5497*
    - DOSE-RESPONSE STUDY, REVIEW, 5431
    - REVIEW, 5429
    - TRANSPLACENTAL CARCINOGENESIS, REVIEW, 5431
  - LUNG
    - LYMPHATIC CHANNELS, REVIEW, 5510*
  - LYMPHATIC SYSTEM
    - CARCINOGENIC POTENTIAL, REVIEW, 5497*
    - ULTRASTRUCTURAL STUDY, REVIEW, 5497*
  - LYMPHOMA
    - CARCINOGENIC POTENTIAL, REVIEW, 5497*
    - THYROTROPIN, 5621
  - MEDULLOBLASTOMA
    - THYROTROPIN, 5621
  - NEOPLASMS
    - CARCINOGENIC POTENTIAL, REVIEW, 5408
    - EPIDEMIOLOGY, REVIEW, 5542*
    - REVIEW, 5429
    - TRANSPLANTATION, HETEROLOGOUS, 5768*
  - NUCLEOPROTEINS
    - CELL CYCLE KINETICS, 5634*
  - OVARY
    - CARCINOGENIC POTENTIAL, REVIEW, 5430
  - PANCREAS
    - CARCINOGENIC POTENTIAL, REVIEW, 5430
  - RADIATION DOSAGE
    - REVIEW, 5429
  - RECEPTORS, HORMONE
    - CELL TRANSFORMATION, NEOPLASTIC, 5926
  - SARCOMA, OSTEOGENIC
    - EPIDEMIOLOGY, REVIEW, 5889*
  - SKIN NEOPLASMS
    - DNA REPAIR, REVIEW, 5407
  - THYROID GLAND
    - CARCINOGENIC POTENTIAL, REVIEW, 5430
  - THYROID NEOPLASMS
    - DOSE-RESPONSE STUDY, REVIEW, 5431
    - LYMPHOMA, 5621
    - MEDULLOBLASTOMA, 5621
  - VIRUS, CYTOMEGALO
    - CELL TRANSFORMATION, NEOPLASTIC, 5692
  - VIRUS, FRIEND MURINE LEUKEMIA
    - IMMUNITY, CELLULAR, 5756*
  - VIRUS, HERPES SIMPLEX
    - CELL TRANSFORMATION, NEOPLASTIC, 5692
  - VIRUS, SV40
    - CELL MIXTURES, 5776*
    - CELL TRANSFORMATION, NEOPLASTIC, 5668
  - XERODERMA PIGMENTOSUM
    - DNA REPAIR, 5622

- RADIOISOTOPES
  - BONE NEOPLASMS
    - DOSE-RESPONSE STUDY, REVIEW, 5491*
    - HISTOLOGICAL STUDY, REVIEW, 5491*
  - LUNG
    - LYMPHATIC CHANNELS, REVIEW, 5510*
  - SARCOMA, OSTEOGENIC
    - RADIUM, 5628*
    - THORIUM, 5628*

- RADIUM
  - SARCOMA, OSTEOGENIC
    - DOSE-RESPONSE STUDY, MOUSE, 5628*
    - HISTOLOGICAL STUDY, MOUSE, 5628*
    - RADIOISOTOPES, 5628*
  - SPINAL CORD NEOPLASMS
    - SARCOMA, OSTEOGENIC, 5628*

- RECEPTORS, DRUG
  - HEPATOMA
    - CATECHOLAMINES, 5957*

- RECEPTORS, HORMONE
  - CELL TRANSFORMATION, NEOPLASTIC
    - INSULIN, 5926
  - CHOLANTHRENE, 3-METHYL-
    - CELL TRANSFORMATION, NEOPLASTIC, 5926
  - ESTROGENS
    - ENDOMETRIUM, RAT, 5949*
  - INSULIN
    - TRYPSIN, 5948*
  - RADIATION, IONIZING
    - CELL TRANSFORMATION, NEOPLASTIC, 5926
  - UTERINE NEOPLASMS
    - ESTROGENS, 5949*
  - VIRUS, MURINE SARCOMA
    - CELL TRANSFORMATION, NEOPLASTIC, 5926
  - VIRUS, SV40
    - CELL TRANSFORMATION, NEOPLASTIC, 5926

- REGENERATION
  - NERVOUS SYSTEM NEOPLASMS
    - NERVE GROWTH FACTOR, 5837*

- RESERPINE
  - BREAST NEOPLASMS
    - EPIDEMIOLOGY, 5558
    - ISOLATION AND CHARACTERIZATION, 5414
    - MENOPAUSE, 5558
  - HEPATOMA
    - CARCINOGENIC ACTIVITY, MOUSE, 5414
  - LYMPHOSARCOMA
    - CARCINOGENIC ACTIVITY, MOUSE, 5414
  - MAMMARY NEOPLASMS, EXPERIMENTAL
    - CARCINOGENIC ACTIVITY, MOUSE, 5414

- RESPIRATORY TRACT NEOPLASMS
  - CARCINOMA, EPIDERMOID
    - CASE REPORT, 5801

    - CHALONES, 5943*
  - OCCUPATIONAL HAZARD
    - FIBROUS GLASS, 5869
  - RHINOSCLEROMA
    - CASE REPORT, 5801
    - RADIOTHERAPY, 5801
  - SMOKING
    - EPIDEMIOLOGY, REVIEW, 5480*

- RETICULOCYTES
  - LEUKEMIA
    - CELL ADHESION, 5966*

- RETICULOSARCOMA
  - SEE SARCOMA, RETICULUM CELL

- RETINOBLASTOMA
  - ONCOGENIC VIRUSES
    - RISK FACTORS, 5536*

- RETINOL
  - AFLATOXIN B1
    - REVIEW, 5413
  - CARCINOMA, BRONCHOGENIC
    - SERUM LEVELS, 5532*

- RETROPERITONEAL NEOPLASMS
  - EPIDEMIOLOGY, CHILD
    - REVIEW, 5463

- REVERSE TRANSCRIPTASE
  - GASTROINTESTINAL NEOPLASMS
    - ISOLATION AND CHARACTERIZATION, 5700
  - GLIOBLASTOMA MULTIFORME
    - ANTIBODY SPECIFICITY, 5717*
    - ULTRASTRUCTURAL STUDY, 5717*
  - ISOLATION AND CHARACTERIZATION
    - GLIOBLASTOMA MULTIFORME, 5717*
  - LEUKEMIA
    - ANTIBODY SPECIFICITY, 5717*
    - ISOLATION AND CHARACTERIZATION, 5717*
    - ULTRASTRUCTURAL STUDY, 5717*
  - LUNG NEOPLASMS
    - ISOLATION AND CHARACTERIZATION, 5700
  - MELANOMA
    - ANTIBODY SPECIFICITY, 5717*
    - ISOLATION AND CHARACTERIZATION, 5717*
    - ULTRASTRUCTURAL STUDY, 5717*
  - NEOPLASMS, EXPERIMENTAL
    - VIRUS, MURINE MAMMARY TUMOR, 5663
    - VIRUS, RAUSCHER MURINE LEUKEMIA, 5663
    - VIRUS, SIMIAN SARCOMA, 5663
  - ONCOGENIC VIRUSES
    - ISOLATION AND CHARACTERIZATION, REVIEW, 5518*
  - VIRUS, AVIAN MYELOBLASTOSIS
    - ISOLATION AND CHARACTERIZATION, 5652
  - VIRUS, FRIEND MURINE LEUKEMIA
    - ISOLATION AND CHARACTERIZATION, 5652
  - VIRUS, MURINE MAMMARY TUMOR
    - ISOLATION AND CHARACTERIZATION, REVIEW, 5514*
  - VIRUS, RADIATION LEUKEMIA
    - RNA, VIRAL, 5658

- RHABDOMYOSARCOMA
  - ORBITAL NEOPLASMS
    - CASE REPORT, CHILD, 5886*
    - ULTRASTRUCTURAL STUDY, 5886*

- RHINOSCLEROMA
  - RESPIRATORY TRACT NEOPLASMS
    - CASE REPORT, 5801
    - RADIOTHERAPY, 5801

- RIBONUCLEASE
  - MAMMARY NEOPLASMS, EXPERIMENTAL
    - ADENOCARCINOMA, 5959*
  - VIRUS, AVIAN MYELOBLASTOSIS
    - ISOLATION AND CHARACTERIZATION, 5652
    - REVERSE TRANSCRIPTASE, REVIEW, 5503*
  - VIRUS, FRIEND MURINE LEUKEMIA
    - ISOLATION AND CHARACTERIZATION, 5652

- RIBONUCLEOTIDE REDUCTASES
  - CARCINOMA, EHRLICH TUMOR
    - FORMAMIDE, N,N-DIMETHYL-, 5916
    - METHANE, SULFINYLBIS-, 5916

- RIBOSOMAL PROTEINS
  - PLASMACYTOMA
    - PROTEIN KINASE, 5914

- RIBOSOMES
  - GROWTH
    - FIBROBLASTS, 5472
  - PLASMACYTOMA
    - PROTEIN KINASE, 5914

- RIDDELLINE
  - LIVER NEOPLASMS
    - CARCINOGENIC ACTIVITY, RAT, MOU 5418
    - ISOLATION AND CHARACTERIZATION, 5418

- RNA
  - BREAST NEOPLASMS
    - VIRUS, MASON-PFIZER MONKEY, 55
    - VIRUS, MURINE MAMMARY TUMOR, 5
  - CARCINOMA
    - CHROMATIN, 5998*
    - NUCLEOPROTEINS, 5998*
  - CHROMATIN
    - ISOLATION AND CHARACTERIZATION 5998*
  - DIMETHYLAMINE, N-NITROSO-, ACETATE
    - METABOLISM, BACTERIOPHAGE, 557
  - HEPATOMA
    - ISOLATION AND CHARACTERIZATION 6000*
    - PROTEINS, 6000*
  - L CELLS
    - METHYLATED SEQUENCES, 5976*
  - LIVER REGENERATION
    - RNA-DNA HYBRIDIZATION, 5929*
  - NUCLEOPROTEINS
    - ISOLATION AND CHARACTERIZATION

    - 5998*
- UREA, METHYL NITROSO-
    - METABOLISM, BACTERIOPHAGE, 5576

NA, MESSENGER
- 5ALPHA-ANDROSTAN-3-ONE, 17BETA-HYDROXY-
    - LIVER, RAT, 5975*
- ESTRADIOL
    - LIVER, RAT, 5975*
    - OVIDUCTS, CHICK, 5922
- FIBROBLASTS
    - AGING, 5928*
- GROWTH
    - FIBROBLASTS, 5472
- HELA CELLS
    - ETHIDIUM BROMIDE, 5973*
    - RNA, RIBOSOMAL, 5973*
    - TOYOCAMYCIN, 5973*
- L CELLS
    - METHYLATED SEQUENCES, 5976*
- PROGESTERONE
    - OVIDUCTS, CHICK, 5922
- 4,4'-STILBENEDIOL, ALPHA,ALPHA'-DIETHYL-
    - OVIDUCTS, CHICK, 5922
- VIRUS, ADENO 2
    - DNA-RNA HYBRIDIZATION, 5685
    - POLY A, 5685
    - VIRAL PROTEINS, 5685
- VIRUS, SV40
    - ANTIGENS, VIRAL, 5667

NA POLYMERASE
- CHROMATIN
    - LIVER REGENERATION, 5927*, 5999*
- ESTRADIOL
    - OVIDUCTS, CHICK, 5922
- LEUKEMIA, LYMPHOCYTIC
    - LEUKOCYTES, 5921
- LEUKEMIA, MYELOBLASTIC
    - LEUKOCYTES, 5921
- LEUKEMIA, MYELOCYTIC
    - LEUKOCYTES, 5921
- PROGESTERONE
    - OVIDUCTS, CHICK, 5922
- 4,4'-STILBENEDIOL, ALPHA,ALPHA'-DIETHYL-
    - OVIDUCTS, CHICK, 5922

NA REPLICATION
- CHROMATIN
    - CELL CYCLE KINETICS, REVIEW, 5473
- FIBROBLASTS
    - AGING, 5928*
- HELA CELLS
    - ETHIDIUM BROMIDE, 5973*
    - TOYOCAMYCIN, 5973*
- NEOPLASMS
    - AMINO ACIDS, 5977*
    - CYCLOHEXIMIDE, 5977*
- POLY A
    - EMBRYO, MOUSE, 5711*
- VIRUS, RNA TUMOR
    - EMBRYO, MOUSE, 5711*
- YEASTS
    - AMINO ACIDS, 5977*
    - CYCLOHEXIMIDE, 5977*

RNA, RIBOSOMAL
- GROWTH
    - FIBROBLASTS, 5472
- HELA CELLS
    - RNA, MESSENGER, 5973*

RNA, TRANSFER
- GROWTH
    - FIBROBLASTS, 5472
- LEUKEMIA, LYMPHOBLASTIC
    - NUCLEOTIDES, 5989*
- LEUKEMIA, MYELOBLASTIC
    - NUCLEOTIDES, 5989*
- LEUKEMIA, MYELOCYTIC
    - NUCLEOTIDES, 5989*
- VIRUS, SENDAI
    - CELL FUSION, 5698
    - ERYTHROCYTES, 5698

RNA, TRANSFER, METHYLTRANSFERASES
- BURKITT'S LYMPHOMA
    - REVIEW, 5978*
- CELL TRANSFORMATION, NEOPLASTIC
    - REVIEW, 5978*

RNA, VIRAL
- BONE NEOPLASMS
    - ISOLATION AND CHARACTERIZATION, REVIEW, 5524*
- GASTROINTESTINAL NEOPLASMS
    - DNA-RNA HYBRIDIZATION, 5700
    - ISOLATION AND CHARACTERIZATION, 5700
- GLIOBLASTOMA MULTIFORME
    - ISOLATION AND CHARACTERIZATION, 5717*
- LEUKEMIA
    - ISOLATION AND CHARACTERIZATION, 5717*
- LUNG NEOPLASMS
    - DNA-RNA HYBRIDIZATION, 5700
    - ISOLATION AND CHARACTERIZATION, 5700
- MELANOMA
    - ISOLATION AND CHARACTERIZATION, 5717*
- NEOPLASMS, EXPERIMENTAL
    - VIRUS, MURINE MAMMARY TUMOR, 5663
    - VIRUS, RAUSCHER MURINE LEUKEMIA, 5663
    - VIRUS, SIMIAN SARCOMA, 5663
- VIRUS, ADENO 5
    - CELL TRANSFORMATION, NEOPLASTIC, 5686
    - DNA-DNA HYBRIDIZATION, 5686
- VIRUS, ADENO 12
    - DNA-RNA HYBRIDIZATION, 5687
    - VIRUS REPLICATION, 5687
- VIRUS, AVIAN LEUKOSIS
    - DNA-RNA HYBRIDIZATION, 5643
- VIRUS, ENCEPHALOMYOCARDITIS
    - OLIGONUCLEOTIDES, 5720*
- VIRUS, FOOT AND MOUTH DISEASE
    - OLIGONUCLEOTIDES, 5720*
- VIRUS, PICORNA
    - OLIGONUCLEOTIDES, 5720*
    - POLY A, 5720*
- VIRUS, POLIO
    - OLIGONUCLEOTIDES, 5720*

- VIRUS, RADIATION LEUKEMIA
    - DNA-RNA HYBRIDIZATION, 5658
    - ISOLATION AND CHARACTERIZATION, 5658
    - REVERSE TRANSCRIPTASE, 5658
    - VIRUS-LIKE PARTICLES, 5658
- VIRUS, RAUSCHER MURINE LEUKEMIA
    - PEPTIDES, 5661
    - TRANSLATION, HETEROLOGOUS CELL-FREE SYSTEM, 5661
    - VIRAL PROTEINS, 5661
- VIRUS, VESICULAR STOMATITIS
    - OLIGONUCLEOTIDES, 5720*

SACCHAROMYCES CEREVISIAE
- CARCINOGEN, CHEMICAL
    - MUTAGENIC ACTIVITY ASSAY, REVIEW, 5479*

SALMONELLA
- CARCINOGEN, CHEMICAL
    - MUTAGENIC ACTIVITY ASSAY, REVIEW, 5479*

SALMONELLA TYPHIMURIUM
- TRIAZENE, 3,3-DIMETHYL-1-PHENYL-
    - MUTAGENIC ACTIVITY, 5616*

SARCOMA
- ANTIBODIES, NEOPLASM
    - IMMUNE RESPONSE, 5774*
    - NEOPLASM REGRESSION, SPONTANEOUS, 5746
    - TRANSPLANTATION IMMUNOLOGY, 5746
- ANTIGENS, NEOPLASM
    - IMMUNITY, CELLULAR, 5735
- BRAIN NEOPLASMS
    - VIRUS, B77, 5733
- CARCINOEMBRYONIC ANTIGEN
    - IMMUNITY, CELLULAR, 5735
- CELL AGGREGATION
    - ULTRASTRUCTURAL STUDY, MOUSE, 5967*
- CELL DIFFERENTIATION
    - CELL MEMBRANE, REVIEW, 5523*
- CELLS, CULTURED
    - IMMUNOGLOBULINS, 5746
- CHOLANTHRENE, 3-METHYL-
    - IMMUNITY, CELLULAR, 5735
    - TRANSPLANTATION IMMUNOLOGY, 5741, 5746
- CONTACT INHIBITION
    - ULTRASTRUCTURAL STUDY, MOUSE, 5967*
- ETHANE, 2-BROMO-2-CHLORO-1,1,1-TRIFLUORO-
    - NEOPLASM METASTASIS, 5741
    - TRANSPLANTATION IMMUNOLOGY, 5741
- 2,4-HEXADIENOIC ACID, 3-METHOXY-5-METHYL-4-OXO-
    - ISOLATION AND CHARACTERIZATION, 5422
- HYPERSENSITIVITY, DELAYED
    - IMMUNE RESPONSE, 5774*
- LIVER
    - CITRIC ACID, 5969*
    - COENZYME A, 5969*
- LYMPHOCYTE TRANSFORMATION
    - IMMUNE RESPONSE, 5774*
- NEOPLASM METASTASIS
    - ANTIBODIES, NEOPLASM, 5774*
    - HYPERSENSITIVITY, DELAYED, 5774*
    - LYMPHOCYTE TRANSFORMATION, 5774*
- VIRUS, CYTOMEGALO
    - NEOPLASM METASTASIS, 5692
- VIRUS, HERPES SIMPLEX
    - NEOPLASM METASTASIS, 5692

SARCOMA, EWING'S
- CHILD
    - EPIDEMIOLOGY, REVIEW, 5889*
- GENETICS
    - EPIDEMIOLOGY, REVIEW, 5889*

SARCOMA, MAST CELL
- LYMPHOCYTES
    - IMMUNITY, CELLULAR, 5738
- MACROPHAGES
    - IMMUNE SERUMS, 5738
    - IMMUNITY, CELLULAR, 5738

SARCOMA, OSTEOGENIC
- CHILD
    - EPIDEMIOLOGY, REVIEW, 5889*
- GENETICS
    - EPIDEMIOLOGY, REVIEW, 5889*
- NEOPLASMS, MULTIPLE PRIMARY
    - PLUTONIUM, 5627*
- PLUTONIUM
    - EPIDEMIOLOGY, DOG, 5627*
    - HISTOLOGICAL STUDY, DOG, 5627*
- RADIATION, IONIZING
    - EPIDEMIOLOGY, REVIEW, 5889*
- RADIUM
    - DOSE-RESPONSE STUDY, MOUSE, 562
    - HISTOLOGICAL STUDY, MOUSE, 5628
    - RADIOISOTOPES, 5628*
- SPINAL CORD NEOPLASMS
    - RADIUM, 5628*
    - THORIUM, 5628*
- THORIUM
    - DOSE-RESPONSE STUDY, MOUSE, 562
    - HISTOLOGICAL STUDY, MOUSE, 5628
    - RADIOISOTOPES, 5628*
- VIRUS, FELINE SARCOMA
    - DNA-RNA HYBRIDIZATION, 5655
- VIRUS, MURINE LEUKEMIA
    - DNA-RNA HYBRIDIZATION, 5655
- VIRUS, MURINE SARCOMA
    - DNA-RNA HYBRIDIZATION, 5655
- VIRUS, SIMIAN SARCOMA
    - DNA-RNA HYBRIDIZATION, 5655

SARCOMA, RETICULUM CELL
- CASE REPORT
    - TRANSPLANTATION. HOMOLOGOUS. 59
- IMMUNOGLOBULINS, SURFACE
    - ANTIGEN-ANTIBODY REACTIONS, 572
    - IGG, 5726
- LYMPHOCYTES

    - CLASSIFICATION, 5752*
- NEOPLASMS, EXPERIMENTAL
    - ARTERIAL RESISTANCE, 5477

CHISTOSOMA HAEMATOBIUM
- UROGENITAL NEOPLASMS
    - EPIDEMIOLOGY, REVIEW, 5537*

EBACEOUS CYST
- COLONIC NEOPLASMS
    - CASE REPORT, 5629*
- POLYPS
    - GENETICS, 5829*

EMINOMA
- SEE DISGERMINOMA

ENKIRKINE, HYDROXY-
- BRAIN NEOPLASMS
    - ASTROCYTOMA, 5416
    - CARCINOGENIC ACTIVITY, RAT, 5416

ERINE HYDROXYMETHYLTRANSFERASE
- LEUKEMIA L1210
    - ENZYMATIC ACTIVITY, PIG, MOUSE, 5920

IALIC ACIDS
- LIVER NEOPLASMS
    - ACETAMIDE, N-FLUOREN-2-YL-, 5598*

JOGREN'S SYNDROME
- LUNG NEOPLASMS
    - CASE REPORT, 5815*
- LYMPHOMA
    - CASE REPORT, 5815*
    - IMMUNOGLOBULINS, SURFACE, 5815*
    - NEOPLASM CIRCULATING CELLS, 5815*

KELETON
- CELL DIFFERENTIATION
    - ABNORMALITIES, REVIEW, 5531*
- PLUTONIUM
    - TISSUE DISTRIBUTION, DOG, 5627*

KIN
- BENZ(A)ANTHRACENE-7,12-DIMETHANOL
    - FLUORESCENCE, MOUSE, 5562
- BENZ(A)ANTHRACENE, 7,12-DIMETHYL-
    - FLUORESCENCE, MOUSE, 5562
- BENZ(A)ANTHRACENE-7-METHANOL, 12-METHYL-
    - FLUORESCENCE, MOUSE, 5562

SKIN DISEASES
- LIGHT
    - DNA REPAIR, 5624
- ULTRAVIOLET RAYS
    - DNA REPAIR, 5624

SKIN NEOPLASMS
- ARSENIC
    - DNA REPAIR, REVIEW, 5407
- BENZO(A)PYRENE
    - 1,8,9-ANTHRACENETRIOL, 5568
    - DECANE, 5568
    - ESCULIN, 5568
    - FLAVONE, 3,3',4',5,7-PENTAHYDROXY-, 5568
    - 9-OCTADECENOIC ACID, 5568
    - PYRENE, 5568
    - PYROCATECHOL, 5568
    - PYROGALLOL, 5568
    - SQUALENE, 5568
    - 12-O-TETRADECANOYLPHORBOL-13-ACETATE, 5568
- CARCINOGEN, CHEMICAL
    - MOUSE, REVIEW, 5484*
- CARCINOMA, BASAL CELL
    - CASE REPORT, 5788
    - ULTRASTRUCTURAL STUDY, 5836*
- DERMATITIS EXFOLIATIVA
    - IMMUNE RESPONSE, 5456
    - REVIEW, 5456
    - SEZARY CELL, 5456
- GENETICS
    - REVIEW, 5789
- IMMUNOSUPPRESSION
    - EPIDEMIOLOGY, REVIEW, 5881
- LYMPHOMA
    - B-LYMPHOCYTES, 5752*
    - T-LYMPHOCYTES, 5752*
- MACROPHAGES
    - MEMBRANE POTENTIALS, 5744
- MELANOMA
    - REVIEW, 5789
- PALMITATES
    - CO-CARCINOGENS, REVIEW, 5404
- PHORBOL
    - CO-CARCINOGENS, REVIEW, 5404
- PRECANCEROUS CONDITIONS
    - REVIEW, 5789
- RADIATION, IONIZING
    - DNA REPAIR, REVIEW, 5407
- RETICULOSIS
    - CASE REPORT, 5838*
- 12-O-TETRADECANOYLPHORBOL-13-ACETATE
    - CO-CARCINOGENS, REVIEW, 5404
- ULTRAVIOLET RAYS
    - CARCINOGENIC ACTIVITY, REVIEW, 5501*
    - DOSE-RESPONSE STUDY, REVIEW, 5501*
    - OZONE REDUCTION, MATHEMATICAL MODEL, 5620
- URACIL, 5-FLUORO-
    - IMMUNE RESPONSE, REVIEW, 5407
- VIRUS, PAPILLOMA
    - EPIDEMIOLOGY, CHILD, 5880
- WARTS
    - EPIDEMIOLOGY, CHILD, 5880

SMOKING
- AORTA
    - ARTERIOSCLEROSIS, 5487*
- LARYNGEAL NEOPLASMS
    - ARYL HYDROCARBON HYDROXYLASES, 5600*
- LEUKOPLAKIA, ORAL
    - EPIDEMIOLOGY, INDIA, 5890*
- LUNG
    - ALVEOLAR HISTICOTYES, FLUORESCENT, 5487*
    - ENZYMATIC ACTIVITY, 5487*
- LUNG NEOPLASMS
    - ASBESTOSIS, 5802
    - EPIDEMIOLOGY, REVIEW, 5480*
    - EPIDEMIOLOGY, WOMEN, WALES, 5872
- NEOPLASMS

    - EPIDEMIOLOGY, REVIEW, 5542*
  - PANCREATIC NEOPLASMS
    - EPIDEMIOLOGY, REVIEW, 5480*
  - RESPIRATORY TRACT NEOPLASMS
    - EPIDEMIOLOGY, REVIEW, 5480*
  - UROGENITAL NEOPLASMS
    - EPIDEMIOLOGY, REVIEW, 5480*, 5537*

- SODIUM CHLORIDE
  - CHROMATIN
    - CELL CYCLE KINETICS. REVIEW, 5473
  - GASTROINTESTINAL NEOPLASMS
    - GUANIDINE, 1-METHYL-3-NITRO-1-NITROSO-, 5582
  - ISOBUTYRIC ACID, ALPHA-AMINO-
    - CELL TRANSFORMATION, NEOPLASTIC, 5674
  - ULTRAVIOLET RAYS
    - CHROMATIN, 5635*

- SODIUM FLUORIDE
  - LEUKEMIA, LYMPHOCYTIC
    - ADENOSINE CYCLIC 3',5' MONOPHOSPHATE, 5730
  - LEUKEMIA, MYELOCYTIC
    - ADENOSINE CYCLIC 3',5' MONOPHOSPHATE, 5730
  - THYROID NEOPLASMS
    - ADENYL CYCLASE, 5915

- SOMATOTROPIN
  - PITUITARY NEOPLASMS
    - SERUM LEVELS, 5552

- SPERMATOGENESIS
  - NOGALAMYCIN
    - RAT, 5613*
  - VIRUS, HERPES SIMPLEX 1
    - IMMUNE RESPONSE, RABBIT, TESTICLES, 5694
  - VIRUS, HERPES SIMPLEX 2
    - IMMUNE RESPONSE, RABBIT, TESTICLES, 5694

- SPERMATOZOA
  - CYCLOHEXYLAMINE
    - CHROMOSOME ABERRATIONS, 5612*
    - MUTAGENIC ACTIVITY, HAMSTER, 5612*
  - CYCLOPHOSPHAMIDE
    - CHROMOSOME ABERRATIONS, 5612*
    - MUTAGENIC ACTIVITY, HAMSTER, 5612*
  - HISTOCOMPATIBILITY ANTIGENS
    - ISOANTIGENS, REVIEW, 5528*
  - NOGALAMYCIN
    - CHROMOSOME ABERRATIONS, 5613*

- SPINAL CORD NEOPLASMS
  - SARCOMA, OSTEOGENIC
    - RADIUM, 5628*
    - THORIUM, 5628*

- SPLEEN
  - LEUKEMIA, HAIRY CELL
    - ACID PHOSPHATASE, 5917
  - LYMPHOMA
    - ANTIBODY FORMATION, 5770*

- SPLENIC NEOPLASMS
  - LYMPHOSARCOMA
    - HISTOLOGICAL STUDY, 5812*

- SPLENOMEGALY
  - ANEMIA, HEMOLYTIC, AUTOIMMUNE
    - CASE REPORT, CHRONIC LYMPHADENOPATHY, 5828*

- SQUALENE
  - SKIN NEOPLASMS
    - BENZO(A)PYRENE, 5568

- STAPHYLOCOCCUS
  - HYDROLASES
    - ANTI-INFLAMMATORY AGENTS, 5761*
    - ELECTROLYTES, 5761*
  - LEUKOCYTES
    - HYDROLASES, 5761*
  - MACROPHAGES
    - ULTRASTRUCTURAL STUDY, 5761*

- STATOLON
  - VIRUS, FRIEND MURINE LEUKEMIA
    - IMMUNE RESPONSE, 5653
    - INTERFERON, 5653

- STEROIDS
  - BREAST NEOPLASMS
    - EPIDEMIOLOGY, MALE, REIVEW, 546
  - CYTOPLASM
    - BINDING, REVIEW, 5471
    - RNA REPLICATION, REVIEW, 5471
  - HEPATOMA
    - TRANSFERASES, 5565

- 4-STILBENAMINE, N,N-DIMETHYL-
  - CELL TRANSFORMATION, NEOPLASTIC
    - DOSE-RESPONSE STUDY, REVIEW, 54

- 4,4'-STILBENEDIOL, ALPHA,ALPHA'-DIETHYL-
  - ADENOCARCINOMA
    - CASE REPORT, 5825*
  - CERVIX NEOPLASMS
    - ADENOCARCINOMA, 5415
    - REVIEW, 5436
  - ENDOMETRIOSIS
    - CASE REPORT, 5825*
  - GYNECOLOGIC NEOPLASMS
    - ADENOCARCINOMA, 5495*
    - EPIDEMIOLOGY, REVIEW, 5495*
    - HISTOLOGICAL STUDY, REVIEW, 549
  - KIDNEY NEOPLASMS
    - CELL CYCLE KINETICS, 5556
  - OVALBUMIN
    - OVIDUCTS, CHICK, 5922
  - RNA, MESSENGER
    - OVIDUCTS, CHICK, 5922
  - RNA POLYMERASE
    - OVIDUCTS, CHICK, 5922
  - TURNER'S SYNDROME
    - ADENOCARCINOMA, 5825*
    - CASE REPORT, 5825*
  - VAGINAL NEOPLASMS
    - ADENOCARCINOMA, 5415

- STOMACH NEOPLASMS
  - ADENOCARCINOMA
    - UREA, 3-ACETYL-1-METHYL-1-NITRO 5587
  - ADENOMA

        UREA, 3-ACETYL-1-METHYL-1-NITROSO-, 5587
    CARCINOMA, MUCINOUS
        UREA, 3-ACETYL-1-METHYL-1-NITROSO-, 5587
    FIBROSARCOMA
        UREA, 3-ACETYL-1-METHYL-1-NITROSO-, 5587
    GUANIDINE, 1-METHYL-3-NITRO-1-NITROSO-
        BASEMENT MEMBRANE, 5803
        ULTRASTRUCTURAL STUDY, 5803
    LEIOMYOSARCOMA
        UREA, 3-ACETYL-1-METHYL-1-NITROSO-, 5587

TREPTOCOCCUS
    STREPTOCOCCUS FAECALIS
        HYDROLASES, 5761*

TRESS
    MAMMARY NEOPLASMS, EXPERIMENTAL
        ADRENAL GLANDS, 5604*
        ASCORBIC ACID, 5604*
        BENZ(A)ANTHRACENE, 7,12-DIMETHYL-, 5604*

UCCINATE DEHYDROGENASE
    MAMMAE
        CELLS, CULTURED, 5972*

UCCINIMIDE, N-(3,5-DICHLOROPHENYL)-
    KIDNEY NEOPLASMS
        CITRININ, 5578

URFACE PROPERTIES
    HEPATOMA
        CELL LINE, 5467
    LYMPHOCYTES
        ANTIGEN-ANTIBODY COMPLEX, 5766*
    MACROPHAGES
        ANTIGEN-ANTIBODY COMPLEX, 5766*

SURGERY, OPERATIVE
    BREAST NEOPLASMS
        PROGNOSIS, MALE, REVIEW, 5460

SUTURES
    MELANOMA
        ALLOYS, 5637*
        NEOPLASM TRANSPLANTATION, 5637*
        NYLON, 5637*
        POLYGLYCOLIC ACID, 5637*
        WOUND INFECTION, 5637*

SWEAT GLAND NEOPLASMS
    CELL DIFFERENTIATION
        HISTOLOGICAL STUDY, 5840*
    NEOPLASM METASTASIS
        CASE REPORT, 5840*

SYNOVITIS
    NEOPLASMS, CONNECTIVE TISSUE
        CASE REPORT, 5839*

TARTARIC ACID
    LEUKEMIA, HAIRY CELL
        ACID PHOSPHATASE, 5804

TERATOID TUMOR
    HISTOCOMPATIBILITY ANTIGENS
        ISOANTIGENS, REVIEW, 5528*
    KIDNEY NEOPLASMS
        CITRININ, 5578
    MACROPHAGES
        CHEMOTAXIS, INHIBITORY FACTOR, 5763*
    OVARIAN NEOPLASMS
        DIAGNOSIS AND TREATMENT, 5533*
    VIRUS, ADENO 2
        ANTIGENS, VIRAL, 5684
        VIRUS REPLICATION, 5684

TESTICULAR NEOPLASMS
    CARCINOID TUMOR
        EPIDEMIOLOGY, 5779
        HISTOLOGICAL STUDY, 5779
    DISGERMINOMA
        CASE REPORT, BILATERAL TUMOR, 5826*
    EPITHELIAL TUMOR
        EPIDEMIOLOGY, 5779
        HISTOLOGICAL STUDY, 5779
    INCIDENCE RATES
        EPIDEMIOLOGY, REVIEW, 5866
    LYMPHOSARCOMA
        HISTOLOGICAL STUDY, 5812*
    NEOPLASMS, EMBRYONAL AND MIXED
        EPIDEMIOLOGY, 5779
        HISTOLOGICAL STUDY, 5779

TESTOSTERONE
    PITUITARY NEOPLASMS
        GROWTH, 5552
    PROLACTIN
        METABOLISM, 5559
        PROSTATE, RAT, 5559

12-O-TETRADECANOYLPHORBOL-13-ACETATE
    SKIN NEOPLASMS
        BENZO(A)PYRENE, 5568
        CO-CARCINOGENS, REVIEW, 5404

TETRAHYDROFOLATE DEHYDROGENASE
    LEUKEMIA, LYMPHOBLASTIC
        HISTOLOGICAL STUDY, 5982*
    LEUKEMIA, MYELOBLASTIC
        HISTOLOGICAL STUDY, 5982*
    LEUKEMIA, MYELOCYTIC
        HISTOLOGICAL STUDY, 5982*

TETRAHYDROFOLATES
    LEUKEMIA L1210
        TRANSFERASES, 5981*

THEOPHYLLINE
    LEUKEMIA, LYMPHOCYTIC
        ADENOSINE CYCLIC 3',5' MONOPHOSPHATE, 5730
    LEUKEMIA, MYELOCYTIC
        ADENOSINE CYCLIC 3',5' MONOPHOSPHATE, 5730
    MELANOMA
        VIRUS-LIKE PARTICLES, 5834*
    NEUROBLASTOMA
        CARBOXY-LYASES, 5986*
    PHOSPHODIESTERASES
        CELL TRANSFORMATION, NEOPLASTIC, 5987*

- PLASMINOGEN
  - OVARY, HAMSTER, 5918

- THORIUM
  - SARCOMA, OSTEOGENIC
    - DOSE-RESPONSE STUDY, MOUSE, 5628*
    - HISTOLOGICAL STUDY, MOUSE, 5628*
    - RADIOISOTOPES, 5628*
  - SPINAL CORD NEOPLASMS
    - SARCOMA, OSTEOGENIC, 5628*

- THORIUM DIOXIDE
  - HEPATOMA
    - CASE REPORT, 5625
    - RETENTION, SPLEEN AND LIVER, 5625
  - PANCREATIC NEOPLASMS
    - ADENOCARCINOMA, 5625
    - CASE REPORT, 5625
    - RETENTION, SPLEEN AND LIVER, 5625

- THROMBOPLASTIN
  - MAMMARY NEOPLASMS, EXPERIMENTAL
    - FIBRINOGEN, 5941*
    - FIBRINOLYSIS, 5941*
  - NEOPLASMS
    - FIBRINOGEN, 5941*
    - FIBRINOLYSIS, 5941*

- THYMECTOMY
  - NEOPLASMS
    - TRANSPLANTATION, HETEROLOGOUS, 5768*

- THYMIDINE
  - HELA CELLS
    - CELL CYCLE KINETICS, 5911
    - INOSINE, NITROBENZYLTHIO-, 5911
  - VIRUS, ROUS SARCOMA
    - CELL TRANSFORMATION, NEOPLASTIC, 5645

- THYMIDINE KINASE
  - ACRIDINE MUSTARD
    - HAPLOID CELLS, 5610*
    - MUTAGENIC ACTIVITY, 5610*
  - URIDINE, 5-BROMO-2'-DEOXY-
    - ACRIDINE MUSTARD, 5610*

- THYMOMA
  - CELL MEMBRANE
    - NUCLEOTIDASES, 5979*
    - PHOSPHODIESTERASES, 5979*
  - GLYCOLYSIS
    - ENZYMATIC ACTIVITY, 5979*

- THYMUS NEOPLASMS
  - CARCINOID TUMOR
    - CALCITONIN, 5906
  - NEOPLASMS, MULTIPLE PRIMARY
    - EPIDEMIOLOGY, RAT, 5895*

- THYROID DISEASES
  - GOITER
    - ADENYL CYCLASE, 5846*

- THYROID NEOPLASMS
  - ADENOCARCINOMA
    - ADENYL CYCLASE, 5846*, 5915
    - PHOSPHOTRANSFERASES, 5915
    - ULTRASTRUCTURAL STUDY, 5845*
  - ADENOMA
    - ADENYL CYCLASE, 5846*
    - NEOPLASM METASTASIS, 5784
    - NEOPLASM RECURRENCE, LOCAL, 5784
    - ULTRASTRUCTURAL STUDY, 5845*
  - ADENOSINE CYCLIC 3',5 MONOPHOSPHATE
    - ADENYL CYCLASE, 5915
    - PHOSPHOTRANSFERASES, 5915
  - CARCINOMA
    - NEOPLASM RECURRENCE, LOCAL, 5784
    - ULTRASTRUCTURAL STUDY, 5845*
  - CARCINOMA, PAPILLARY
    - ADENYL CYCLASE, 5915
    - HYPERPARATHYROIDISM, 5844*
    - PHOSPHOTRANSFERASES, 5915
    - ULTRASTRUCTURAL STUDY, 5845*
  - CHROMOSOME ABERRATIONS
    - CASE REPORT, 5816*
    - CHROMOSOMES, HUMAN, 13-15, 5816*
  - GENETICS
    - CASE REPORT, 5785
  - HYPERPARATHYROIDISM
    - CASE REPORT, 5844*
  - LYMPHOMA
    - CASE REPORT, 5816*
    - CHROMOSOME ABERRATIONS, 5816*
    - RADIATION, IONIZING, 5621
    - RADIOTHERAPY, 5621
  - MEDULLOBLASTOMA
    - RADIATION, IONIZING, 5621
  - PARATHYROID NEOPLASMS
    - CASE REPORT, 5844*
  - PHEOCHROMOCYTOMA
    - CASE REPORT, 5785
    - GENETICS, 5785
    - GLUCOSEPHOSPHATE DEHYDROGENASE, 5785
  - PROSTAGLANDINS E
    - ADENYL CYCLASE, 5915
  - RADIATION, IONIZING
    - DOSE-RESPONSE STUDY, REVIEW, 5431
  - SODIUM FLUORIDE
    - ADENYL CYCLASE, 5915
  - THYROTROPIN
    - ADENYL CYCLASE, 5915

- THYRONINE
  - DNA REPLICATION
    - LYMPHOCYTES, 5923

- THYROTROPIN
  - CHORIOCARCINOMA
    - ISOLATION AND CHARACTERIZATION, REVIEW, 5451
  - HYDATIDIFORM MOLE
    - ISOLATION AND CHARACTERIZATION, REVIEW, 5451
  - HYPERTHYROIDISM
    - ETIOLOGY, REVIEW, 5451
  - LYMPHOMA
    - RADIATION, IONIZING, 5621
  - MEDULLOBLASTOMA
    - RADIATION, IONIZING, 5621
  - THYROID NEOPLASMS
    - ADENYL CYCLASE, 5915

- THYROXINE
  - DNA REPLICATION

        LYMPHOCYTES, 5923
    PITUITARY NEOPLASMS
        GROWTH, 5554
        URACIL, 6-PROPYL-2-THIO-, 5553

SUE CULTURE
    HEPATOMA
        AUSTRALIA ANTIGEN, 5722*
    VIRUS, SV40
        CELL TRANSFORMATION, NEOPLASTIC, 5671

ACCO
    LEUKOPLAKIA, ORAL
        EPIDEMIOLOGY, INDIA, 5890*

OLUIDINE, N,N-DIMETHYL-4-(PHENYLAZO)-
    LIVER NEOPLASMS
        ADENOSINE TRIPHOSPHATASE, 5579
        PRECANCEROUS CONDITIONS, 5579

IGUE NEOPLASMS
    METAPLASIA
        HISTOLOGICAL STUDY, 5854*

OCAMYCIN
    HELA CELLS
        RNA, MESSENGER, 5973*
        RNA REPLICATION, 5973*

CE ELEMENTS
    ENVIRONMENTAL HAZARD
        CARCINOGENIC POTENTIAL, REVIEW, 5489*
    ENVIRONMENTAL POLLUTANTS
        INSTRUMENTATION, REVIEW, 5493*
        SAMPLING AND ANALYSIS, REVIEW, 5493*

CHEA
    BENZO(A)PYRENE
        METABOLISM, RAT AND HAMSTER, 5567

ANSFERASES
    HEPATOMA
        BARBITURIC ACID, 5-ETHYL-5-PHENYL-, 5565
        CHOLANTHRENE, 3-METHYL-, 5565
        STEROIDS, 5565
    LEUKEMIA L1210
        AMINOPTERIN, 5981*
        ANTINEOPLASTIC AGENTS, 5981*
        METHOTREXATE, 5981*
        TETRAHYDROFOLATES, 5981*
    MELANOMA
        CELL MEMBRANE, 5996*
        ISCLATION AND CHARACTERIZATION, 5996*
    ULTRAVIOLET RAYS
        MUTATION, 5636*

ANSFORMATION, GENETIC
    CARCINOGEN, CHEMICAL
        MUTAGENIC ACTIVITY, REVIEW, 5401
    VIRUS, ROUS SARCOMA
        DNA, VIRAL, 5646

ANSPLANTATION ANTIGENS
    SEE HISTOCOMPATIBILITY ANTIGENS

TRANSPLANTATION, HETEROLOGOUS
    BREAST NEOPLASMS
        IMMUNOSUPPRESSION, 5768*
    GASTROINTESTINAL NEOPLASMS
        IMMUNOSUPPRESSION, 5768*
    INTESTINAL NEOPLASMS
        CELL DIFFERENTIATION, 5970*
        LACTATE DEHYDROGENASE, 5970*
    NEOPLASMS
        CORTISONE, 5768*
        CYCLOPHOSPHAMIDE, 5768*
        PURINE, 6-((1-METHYL-4-NITROIMIDAZOL-5-YL)THIO)-, 5768*
        RADIATION, IONIZING, 5768*
        THYMECTOMY, 5768*
    UROGENITAL NEOPLASMS
        IMMUNOSUPPRESSION, 5768*

TRANSPLANTATION, HOMOLOGOUS
    BONE NEOPLASMS
        CRITERIA, 5930*
        FIBROSARCOMA, 5930*
        GIANT CELL TUMORS, 5930*
    CASE REPORT
        SARCOMA, RETICULUM CELL, 5930*
    LEYDIG CELL TUMOR
        SYNGENEIC MUSCLE SANDWICH GRAFT, 5771*
    LYMPHOMA
        REVIEW, 5452
    MELANOMA
        SYNGENEIC MUSCLE SANDWICH GRAFT, 5771*
    NEUROBLASTOMA
        SYNGENEIC MUSCLE SANDWICH GRAFT, 5771*

TRANSPLANTATION IMMUNOLOGY
    HELA CELLS
        CELL MIXTURES, 5776*
    LUNG NEOPLASMS
        T-LYMPHOCYTES, 5755*
    MAMMARY NEOPLASMS, EXPERIMENTAL
        CHOLANTHRENE, 3-METHYL-, 5741
        ETHANE, 2-BROMO-2-CHLORO-1,1,1-TRIFLUORO-, 5741
        NEURAMINIDASE, 5745
    NEOPLASMS, EXPERIMENTAL
        HYBRID CELLS, 5764*
    SARCOMA
        ANTIBODIES, NEOPLASM, 5746
        CHOLANTHRENE, 3-METHYL-, 5741, 5746
        ETHANE, 2-BROMO-2-CHLORO-1,1,1-TRIFLUORO-, 5741
    VIRUS, SV40
        CELL MIXTURES, 5776*

TRIAZENE, 3,3-DIMETHYL-1-PHENYL-
    MICROSOMES, LIVER
        MUTAGENIC ACTIVITY, 5616*
    SALMONELLA TYPHIMURIUM
        MUTAGENIC ACTIVITY, 5616*

TRIIODOTHYRONINE
    PITUITARY NEOPLASMS
        GROWTH, 5554
        URACIL, 6-PROPYL-2-THIO-, 5553

- TRYPSIN
  - INSULIN
    - RECEPTORS, HORMONE, 5948*
  - LYMPHOSARCOMA
    - PLANT AGGLUTININS, BINDING, 5958*
  - MAMMARY NEOPLASMS, EXPERIMENTAL
    - ADENOCARCINOMA, 5959*
    - POLY U, 5959*
  - VIRUS, ADENO 1
    - DEOXYRIBONUCLEASE, 5682

- TURNER'S SYNDROME
  - ADENOCARCINOMA
    - CASE REPORT, 5825*
    - ENDOMETRIOSIS, 5825*
    - 4,4'-STILBENEDIOL, ALPHA,ALPHA'-DIETHYL-, 5825*
  - 4,4'-STILBENEDIOL, ALPHA,ALPHA'-DIETHYL-
    - CASE REPORT, 5825*

- TYROSINE
  - MELANOMA
    - METABOLISM, 5792

- ULTRAVIOLET RAYS
  - CATIONS, DIVALENT
    - CHROMATIN, 5635*
  - CELL TRANSFORMATION, NEOPLASTIC
    - EMBRYO, HAMSTER, 5629*
  - CHROMATIN
    - DNA, CROSS-LINKING, 5635*
    - OVARY, HAMSTER, 5635*
  - CONJUNCTIVITIS
    - DOSE-RESPONSE STUDY, REVIEW, 5501*
  - CYCLOHEXIMIDE
    - DNA REPAIR, 5550
  - DNA
    - CELL TRANSFORMATION, NEOPLASTIC, 5629*
    - REVIEW, 5428
  - DNA, BACTERIAL
    - PROTEINS, 5427
  - DNA REPAIR
    - DOSE-RESPONSE STUDY, 5550
    - REVIEW, 5428
  - ERYTHEMA
    - DOSE-RESPONSE STUDY, REVIEW, 5501*
  - ESCHERICHIA COLI
    - DNA REPAIR, 5427
  - HYPOXANTHINE PHOSPHORIBOSYLTRANSFERASE
    - MUTAGENIC ACTIVITY, 5636*
    - THIOGUANINE RESISTANCE, 5636*
  - KERATITIS
    - DOSE-RESPONSE STUDY, REVIEW, 5501*
  - PHOSPHOTRANSFERASES, ATP
    - GENETICS, 5638*
    - MUTAGENIC ACTIVITY, OVARY, HAMSTER, 5638*
  - SKIN DISEASES
    - DNA REPAIR, 5624
  - SKIN NEOPLASMS
    - CARCINOGENIC ACTIVITY, REVIEW, 5501*
    - DOSE-RESPONSE STUDY, REVIEW, 5501*
    - OZONE REDUCTION, MATHEMATICAL MODEL, 5620
  - SODIUM CHLORIDE
    - CHROMATIN, 5635*
  - TRANSFERASES
    - MUTATION, 5636*
  - URIDINE, 5-BROMO-2'-DEOXY-
    - CELL TRANSFORMATION, NEOPLASTIC, 5629*
  - VIRUS, HERPES SIMPLEX 1
    - DNA REPAIR, 5695
    - XERODERMA PIGMENTOSUM, 5695
  - XERODERMA PIGMENTOSUM
    - AZAGUANINE RESISTANCE, 5630*
    - COLONY FORMATION, 5639*
    - DNA REPAIR, 5622, 5624, 5630*, 5639*
    - DNA REPAIR, REVIEW, 5498*

- URACIL, 5-FLUORO-
  - INTESTINAL NEOPLASMS
    - TREATMENT AND PROGNOSIS, REVIEW, 5538*
  - MELANOMA
    - TREATMENT AND PROGNOSIS, 5794
  - SKIN NEOPLASMS
    - IMMUNE RESPONSE, REVIEW, 5407

- URACIL, 6-PROPYL-2-THIO-
  - PITUITARY NEOPLASMS
    - ESTRADIOL, 5553
    - GROWTH, 5553
    - THYROXINE, 5553
    - TRIIODOTHYRONINE, 5553

- UREA, 3-ACETYL-1-METHYL-1-NITROSO-
  - NERVOUS SYSTEM NEOPLASMS
    - ASTROCYTOMA, 5587
    - EPENDYMOMA, 5587
    - NEOPLASM TRANSPLANTATION, 5587
  - STOMACH NEOPLASMS
    - ADENOCARCINOMA, 5587
    - ADENOMA, 5587
    - CARCINOMA, MUCINOUS, 5587
    - FIBROSARCOMA, 5587
    - LEIOMYOSARCOMA, 5587

- UREA, 3-CYCLOOCTYL-1,1-DIMETHYL-
  - NITROUS ACID
    - DIMETHYLAMINE, N-NITROSO-, 5574

- UREA, ETHYL NITROSO-
  - BRAIN NEOPLASMS
    - TRANSPLACENTAL CARCINOGENESIS, 5589
    - UREA, METHYL NITROSO-, 5589
  - GUANINE
    - DNA REPAIR, REVIEW, 5496*
  - NERVOUS SYSTEM NEOPLASMS
    - CELL TRANSFORMATION, NEOPLASTIC 5860*

- UREA, HYDROXY-
  - DEXAMETHASONE
    - MITOCHONDRIA, LIVER, 5925
  - LEUKEMIA
    - CELL DIVISION, 5903
    - DNA REPLICATION, 5903
    - LEUKOCYTE COUNT, 5903

- UREA, METHYL NITROSO-
  - BRAIN NEOPLASMS
    - MICROCEPHALY, 5589

    - TRANSPLACENTAL CARCINOGENESIS, 5589
    - UREA, ETHYL NITROSO-, 5589
- GUANINE
    - DNA REPAIR, REVIEW, 5496*
- HELA CELLS
    - DNA REPAIR, 5586
- MAMMAE
    - DNA REPAIR, 5588
- NA
    - METABOLISM, BACTERIOPHAGE, 5576

A, 3-(P-(P-CHLOROPHENOXY)PHENYL)-1,1-IMETHYL-
- NITROUS ACID
    - DIMETHYLAMINE, N-NITROSO-, 5574

DINE
- GALACTOSE
    - CELL TRANSFORMATION, NEOPLASTIC, 5939*
- HELA CELLS
    - INOSINE, NITROBENZYLTHIO-, 5911
- VIRUS, POLYOMA
    - METABOLISM, 5939*
- VIRUS, ROUS SARCOMA
    - CELL TRANSFORMATION, NEOPLASTIC, 5645

DINE, 5-BROMO-2'-DEOXY-
- ACRIDINE MUSTARD
    - THYMIDINE KINASE, 5610*
- CELL TRANSFORMATION, NEOPLASTIC
    - EMBRYO, HAMSTER, 5629*
- DNA, SINGLE STRANDED
    - EMBRYO, RAT, 5709*
- GLUCOSEPHOSPHATE DEHYDROGENASE
    - MUTAGENIC ACTIVITY, 5919
- MELANOMA
    - GLUCOSEPHOSPHATE DEHYDROGENASE, 5919
- ULTRAVIOLET RAYS
    - CELL TRANSFORMATION, NEOPLASTIC, 5629*

IDINE, 2'-DEOXY-5-IODO-
- LYMPHOMA
    - DNA REPAIR, 5583
    - DNA REPLICATION, 5583
- POLYCYCLIC HYDROCARBONS
    - CELL TRANSFORMATION, NEOPLASTIC, 5614*

OGENITAL NEOPLASMS
- P-ACETOPHENETIDIDE
    - EPIDEMIOLOGY, 5893*
- AMINES
    - EPIDEMIOLOGY, REVIEW, 5537*
- INCIDENCE RATES
    - EPIDEMIOLOGY, REVIEW, 5537*
- 2-NAPHTHYLAMINE
    - EPIDEMIOLOGY, REVIEW, 5537*
- NEOPLASMS, MULTIPLE PRIMARY
    - EPIDEMIOLOGY, 5865
- NEPHRITIS, INTERSTITIAL
    - EPIDEMIOLOGY, 5893*
- SCHISTOSOMA HAEMATOBIUM
    - EPIDEMIOLOGY, REVIEW, 5537*
- SMOKING
    - EPIDEMIOLOGY, REVIEW, 5480*, 5537*
- TRANSPLANTATION, HETEROLOGOUS
    - IMMUNOSUPPRESSION, 5768*

UTERINE NEOPLASMS
- ADENOCARCINOMA
    - CASE REPORT, 5825*
- CARCINOMA
    - EPIDEMIOLOGY, CZECHOSLOVAKIA, 5867
- CONTRACEPTIVES, ORAL
    - REVIEW, 5423
- ESTRADIOL
    - NUCLEIC ACIDS, 5951*
- ESTROGENS
    - HORMONE REPLACEMENT THERAPY, 5419
    - MENOPAUSE, 5419
    - RECEPTORS, HORMONE, 5949*
    - REVIEW, 5423
- NEOPLASMS, MULTIPLE PRIMARY
    - EPIDEMIOLOGY, 5865
- PROGESTERONE
    - HISTOLOGICAL SUTDY, 5951*
    - NUCLEIC ACIDS, 5951*

VAGINAL NEOPLASMS
- ADENOCARCINOMA
    - 4,4'-STILBENEDIOL, ALPHA,ALPHA'-DIETHYL-, 5415

VALERIC ACID, 2,2-DIPHENYL-, 2-(DIETHYLAMINO)ETHYL ESTER HCL
- BLOOD CIRCULATION
    - LIVER, RAT, 5572
- ETHYLENE, CHLORO-
    - METABOLISM, RAT, 5592

VENEREAL DISEASES
- VIRUS, HERPES SIMPLEX 1
    - EPIDEMIOLOGY, REVIEW, 5894*
- VIRUS, HERPES SIMPLEX 2
    - EPIDEMIOLOGY, REVIEW, 5894*

VINYL CHLORIDE
- SEE ETHYLENE, CHLORO-

VIRAL PROTEINS
- HELA CELLS
    - VIRUS, ADENO 2 - SV40 HYBRID, 5677
- ONCOGENIC VIRUSES
    - MIXED INFECTIONS, REVIEW, 5435
- VIRUS, ADENO 2
    - ISOLATION AND CHARACTERIZATION, 5683, 5685
    - RNA, MESSENGER, 5685
- VIRUS, ADENO 2 - SV40 HYBRID
    - ISOLATION AND CHARACTERIZATION, 5677
    - VIRUS REPLICATION, 5677
- VIRUS, AVIAN LEUKOSIS-SARCOMA
    - DNA, VIRAL, 5642
- VIRUS, AVIAN MYELOBLASTOSIS
    - REVIEW, 5529*
- VIRUS, FELINE LEUKEMIA
    - REVIEW, 5529*
    - ULTRASTRUCTURAL STUDY, REVIEW, 5512*
- VIRUS, FRIEND MURINE LEUKEMIA
    - REVIEW, 5529*
- VIRUS, RAUSCHER MURINE LEUKEMIA

    - RNA, VIRAL, 5661
  - VIRUS, SV40
    - DNA, VIRAL, 5675
    - ENDONUCLEASES, 5675

- VIRAL VACCINES
  - BENZO(A)PYRENE
    - CELL TRANSFORMATION, NEOPLASTIC, 5566
    - VIRUS, FRIEND MURINE LEUKEMIA, 5566
    - VIRUS, ROUS SARCOMA, 5566
  - CHOLANTHRENE, 3-METHYL-
    - CELL TRANSFORMATION, NEOPLASTIC, 5566
    - VIRUS, FRIEND MURINE LEUKEMIA, 5566
    - VIRUS, ROUS SARCOMA, 5566
  - LYMPHOMA
    - VIRUS, HERPES SAIMIRI, 5696
  - ONCOGENIC VIRUSES
    - IMMUNOTHERAPY, REVIEW, 5522*
  - VIRUS, CYTOMEGALO
    - VIRUS, SV40, 5692
  - VIRUS, FRIEND MURINE LEUKEMIA
    - BENZO(A)PYRENE, 5566
    - CHOLANTHRENE, 3-METHYL-, 5566
  - VIRUS, HERPES SAIMIRI
    - IMMUNE RESPONSE, 5696
  - VIRUS, HERPES SIMPLEX
    - VIRUS, SV40, 5692
  - VIRUS, ROUS SARCOMA
    - BENZO(A)PYRENE, 5566
    - CHOLANTHRENE, 3-METHYL-, 5566

- VIRUS, ADENO 1
  - ANTI-ANTIBODIES
    - DEOXYRIBONUCLEASE, 5682
  - DEOXYRIBONUCLEASE
    - ISOLATION AND CHARACTERIZATION, HEP-2 CELLS, 5682
  - ENDONUCLEASES
    - ISOLATION AND CHARACTERIZATION, HEP-2 CELLS, 5682
  - TRYPSIN
    - DEOXYRIBONUCLEASE, 5682

- VIRUS, ADENO 2
  - DNA, VIRAL
    - ISOLATION AND CHARACTERIZATION, 5683
  - PEPTIDES
    - ISOLATION AND CHARACTERIZATION, 5683
  - RNA, MESSENGER
    - DNA-RNA HYBRIDIZATION, 5685
    - POLY A, 5685
    - VIRAL PROTEINS, 5685
  - TERATOID TUMOR
    - ANTIGENS, VIRAL, 5684
    - VIRUS REPLICATION, 5684
  - VIRAL PROTEINS
    - ISOLATION AND CHARACTERIZATION, 5683, 5685
  - VIRUS, POLYOMA
    - ANTIGENS, VIRAL, 5684
    - VIRUS REPLICATION, 5684
  - VIRUS, SV40
    - ANTIGENS, VIRAL, 5684
    - VIRUS REPLICATION, 5684

- VIRUS, ADENO 5
  - DNA, VIRAL
    - CELL TRANSFORMATION, NEOPLASTIC, 5686
    - DNA-RNA HYBRIDIZATION, 5686
    - REASSOCIATION KINETICS, 5686
  - RNA, VIRAL
    - CELL TRANSFORMATION, NEOPLASTIC, 5686
    - DNA-DNA HYBRIDIZATION, 5686

- VIRUS, ADENO 12
  - DNA REPAIR
    - SCREENING, CARCINOGENIC CHEMICALS, 5425
  - RNA, VIRAL
    - DNA-RNA HYBRIDIZATION, 5687
    - VIRUS REPLICATION, 5687

- VIRUS, ADENO 2 - SV40 HYBRID
  - HELA CELLS
    - VIRAL PROTEINS, 5677
  - VIRAL PROTEINS
    - ISOLATION AND CHARACTERIZATION, 5677
    - VIRUS REPLICATION, 5677

- VIRUS, AVIAN LEUKEMIA
  - CELL TRANSFORMATION, NEOPLASTIC
    - REVIEW, 5506*
  - VIRUS REPLICATION
    - REVIEW, 5506*

- VIRUS, AVIAN LEUKOSIS
  - CELL TRANSFORMATION, NEOPLASTIC
    - HISTOPATHOLOGICAL STUDY, REVIEW, 5511*
  - HEPATOMA
    - CARCINOGENIC POTENTIAL, REVIEW, 5511*
  - KIDNEY NEOPLASMS
    - CARCINOGENIC POTENTIAL, REVIEW, 5511*
  - T-LYMPHOCYTES
    - LYMPHOCYTE TRANSFORMATION, 5701*
    - VIRUS REPLICATION, 5701*
  - MESOTHELIOMA
    - CARCINOGENIC POTENTIAL, REVIEW, 5511*
  - PLANT AGGLUTININS
    - LYMPHOCYTE TRANSFORMATION, 5701*
  - RNA, VIRAL
    - DNA-RNA HYBRIDIZATION, 5643
  - VIRUS REPLICATION
    - IMMUNITY, CELLULAR, 5701*

- VIRUS, AVIAN LEUKOSIS-SARCOMA
  - CELL TRANSFORMATION, NEOPLASTIC
    - REVIEW, 5506*
  - DNA, VIRAL
    - ANTIGENIC DETERMINANTS, 5642
    - DNA-RNA HYBRIDIZATION, 5642
    - VIRAL PROTEINS, 5642
  - VIRUS REPLICATION
    - REVIEW, 5506*
  - VIRUS, ROUS SARCOMA
    - ANTIGENIC DETERMINANTS, 5642

US, AVIAN MYELOBLASTOSIS
  ANTIGENIC DETERMINANTS
    REVIEW, 5529*
  BERYLLIUM
    DNA NUCLEOTIDYLTRANSFERASES, 5611*
  REVERSE TRANSCRIPTASE
    ISOLATION AND CHARACTERIZATION, 5652
  RIBONUCLEASE
    ISOLATION AND CHARACTERIZATION, 5652
    REVERSE TRANSCRIPTASE, REVIEW, 5503*
  VIRAL PROTEINS
    REVIEW, 5529*
  VIRUS REPLICATION
    REVERSE TRANSCRIPTASE, REVIEW, 5503*

US. AVIAN SARCOMA
  CELL TRANSFORMATION, NEOPLASTIC
    TEMPERATURE SENSITIVE MUTANTS, REVIEW, 5508*
  DNA, VIRAL
    DNA-DNA HYBRIDIZATION, 5643
    NUCLEOTIDES, 5643
  GENOME
    CELL TRANSFORMATION, NEOPLASTIC, 5643
  VIRUS REPLICATION
    TEMPERATURE SENSITIVE MUTANTS, REVIEW, 5508*

US, B77
  BRAIN NEOPLASMS
    ASTROCYTOMA, 5733
    SARCOMA, 5733

US, C-TYPE
  B-LYMPHOCYTES
    VIRUS REPLICATION, 5713*
  MITOGENS
    B-LYMPHOCYTES, 5713*
    VIRUS REPLICATION, 5713*

US, C-TYPE RNA TUMOR
  ADENOCARCINOMA
    ISOLATION AND CHARACTERIZATION, 5710*
  ANTIGENIC DETERMINANTS
    MOUSE, WILD, REVIEW, 5649
  BONE NEOPLASMS
    HISTOLOGICAL STUDY, REVIEW, 5491*
  CELL TRANSFORMATION, NEOPLASTIC
    EMBRYO, MOUSE, 5614*
  LYMPHOMA
    MOUSE, WILD, REVIEW, 5649
  NEOPLASMS
    MOUSE, WILD, REVIEW, 5649
  PARALYSIS
    MOUSE, WILD, REVIEW, 5649
  POLYCYCLIC HYDROCARBONS
    VIRUS REPLICATION, 5614*
  VIRUS-LIKE PARTICLES
    PREGNANCY, MOUSE, 5699
    ULTRASTRUCTURAL STUDY, MOUSE UTERUS, 5699

RUS, CHORIOMENINGITIS

VIRUS, MOLONEY MURINE LEUKEMIA
  IMMUNITY, CELLULAR, 5749

VIRUS, CYTOMEGALO
  CELL TRANSFORMATION, NEOPLASTIC
    ANTIGEN-ANTIBODY REACTIONS, 5692
    IMMUNE RESPONSE, 5692
  RADIATION, IONIZING
    CELL TRANSFORMATION, NEOPLASTIC, 5692
  SARCOMA
    NEOPLASM METASTASIS, 5692
  VIRAL VACCINES
    VIRUS, SV40, 5692

VIRUS, DNA TUMOR
  CELL TRANSFORMATION, NEOPLASTIC
    EPIDEMIOLOGY, REVIEW, 5432
    REVIEW, 5519*
  DNA REPLICATION
    REVIEW, 5519*
  VIRUS REPLICATION
    REVIEW, 5519*

VIRUS, ENCEPHALOMYOCARDITIS
  RNA, VIRAL
    OLIGONUCLEOTIDES, 5720*

VIRUS, EPSTEIN-BARR
  ANTIBODIES, VIRAL
    BABOON, 5688
  BURKITT'S LYMPHOMA
    ANTIGEN-ANTIBODY REACTIONS, REVIEW, 5441
    CARCINOGENIC POTENTIAL, REVIEW, 5433
    CELL TRANSFORMATION, NEOPLASTIC, REVIEW, 5439
    DNA, VIRAL, REVIEW, 5689
  CELL TRANSFORMATION, NEOPLASTIC
    REVIEW, 5440
  HODGKIN'S DISEASE
    ANTIGENS, VIRAL, 5747
    IMMUNITY, CELLULAR, 5747
  INFECTIOUS MONONUCLEOSIS
    ANTIGEN-ANTIBODY REACTIONS, REVIEW, 5441
    CARCINOGENIC POTENTIAL, REVIEW, 5433
  LEUKEMIA, LYMPHOBLASTIC
    DNA, VIRAL, REVIEW, 5689
  B-LYMPHOCYTES
    LYMPHOCYTE TRANSFORMATION, REVIEW, 5689
  NASOPHARYNGEAL NEOPLASMS
    ANTIGEN-ANTIBODY REACTIONS, REVIEW, 5441
    CARCINOGENIC POTENTIAL, REVIEW, 5433
    CELL TRANSFORMATION, NEOPLASTIC, REVIEW, 5439
    DNA, VIRAL, REVIEW, 5689
  VIRUS REPLICATION
    REVIEW, 5440

VIRUS, FELINE LEUKEMIA
  AGE FACTORS
    EPIDEMIOLOGY, 5665
  ANTIBODIES, VIRAL

  - HORIZONTAL TRANSMISSION, 5665
  - IMMUNE RESPONSE, 5665
- ANTIGENIC DETERMINANTS
  - REVIEW, 5529*
- LYMPHOSARCOMA
  - EPIDEMIOLOGY, REVIEW, 5512*
- VIRAL PROTEINS
  - REVIEW, 5529*
  - ULTRASTRUCTURAL STUDY, REVIEW, 5512*
- VIRUS REPLICATION
  - IMMUNE RESPONSE, REVIEW, 5512*
  - ULTRASTRUCTURAL STUDY, REVIEW, 5512*

VIRUS, FELINE SARCOMA
- BURKITT'S LYMPHOMA
  - DNA-RNA HYBRIDIZATION, 5655
- FIBROSARCOMA
  - DNA-RNA HYBRIDIZATION, 5655
- SARCOMA, OSTEOGENIC
  - DNA-RNA HYBRIDIZATION, 5655

VIRUS, FOOT AND MOUTH DISEASE
- RNA, VIRAL
  - OLIGONUCLEOTIDES, 5720*

VIRUS, FRIEND MURINE LEUKEMIA
- ANTIGEN-ANTIBODY REACTIONS
  - CELL TRANSFORMATION, NEOPLASTIC, 5653
- ANTIGENIC DETERMINANTS
  - IMMUNITY, CELLULAR, 5756*
  - REVIEW, 5529*
- ANTIGENS, HETEROGENETIC
  - REVIEW, 5452
- ASCITIC FLUID
  - ANTIGEN-ANTIBODY REACTIONS, 5750
  - IMMUNE RESPONSE, 5750
  - MONOCYTES, SPLEEN, 5750
- BENZO(A)PYRENE
  - VIRAL VACCINES, 5566
- CELL DIFFERENTIATION
  - CELL CYCLE KINETICS, SPLEEN, 5651
- CHOLANTHRENE, 3-METHYL-
  - VIRAL VACCINES, 5566
- FORMALDEHYDE
  - CARCINOGENESIS, CHEMICAL, 5566
- IMMUNITY, PASSIVE
  - LYMPHOCYTE CULTURE TEST, MIXED, 5756*
- IMMUNOSUPPRESSION
  - REVIEW, 5452
- LYMPHOCYTES
  - IMMUNITY, CELLULAR, 5653
- T-LYMPHOCYTES
  - IMMUNITY, CELLULAR, 5756*
  - IMMUNITY, PASSIVE, 5756*
- METHANE, SULFINYLBIS-
  - CARCINOGENESIS, CHEMICAL, 5566
- RADIATION, IONIZING
  - IMMUNITY, CELLULAR, 5756*
- REVERSE TRANSCRIPTASE
  - ISOLATION AND CHARACTERIZATION, 5652
- RIBONUCLEASE
  - ISOLATION AND CHARACTERIZATION, 5652
- STATOLON
  - IMMUNE RESPONSE, 5653
  - INTERFERON, 5653
- VIRAL PROTEINS
  - REVIEW, 5529*

VIRUS, GROSS MURINE LEUKEMIA
- LYMPHOMA
  - CYROPRESERVATION, 5762*
  - IMMUNITY, CELLULAR, 5762*
  - LYMPHOCYTE CYTOTOXICITY, 5762*
  - LYMPHOCYTE TRANSFORMATION, 5762*
  - SYNERGISTIC VIRAL ONCOGENESIS, MOUSE, 5659
  - VIRUS REPLICATION, 5659

VIRUS, GUINEA PIG HERPES
- FIBROSARCOMA
  - ANTIBODIES, VIRAL, 5664
  - ANTIGENS, VIRAL, 5664
  - IMMUNOFLUORESCENCE STUDY, HAMSTER, 5664
  - ULTRASTRUCTURAL STUDY, HAMSTER, 5664

VIRUS, HERPES
- ANTIBODIES, VIRAL
  - BABOON, 5688
- LYMPHOMA
  - EPIDEMIOLOGY, BABOON, 5688

VIRUS, HERPES SAIMIRI
- LEUKEMIA
  - WHITE RABBIT, 5697
- LYMPHOMA
  - VIRAL VACCINES, 5696
  - WHITE RABBIT, 5697
- VIRAL VACCINES
  - IMMUNE RESPONSE, 5696

VIRUS, HERPES SIMPLEX
- CELL TRANSFORMATION, NEOPLASTIC
  - ANTIGEN-ANTIBODY REACTIONS, 5692
  - IMMUNE RESPONSE, 5692
- DNA, VIRAL
  - ISOLATION AND CHARACTERIZATION, REVIEW, 5437
- PEPTIDES
  - VIRUS REPLICATION, REVIEW, 5437
- RADIATION, IONIZING
  - CELL TRANSFORMATION, NEOPLASTIC, 5692
- SARCOMA
  - NEOPLASM METASTASIS, 5692
- VIRAL VACCINES
  - VIRUS, SV40, 5692

VIRUS, HERPES SIMPLEX 1
- ANTIBODIES, VIRAL
  - IMMUNE RESPONSE, RABBIT, TESTICLES 5694
- ANTIBODY FORMATION
  - IMMUNE SERUMS, 5693
  - QUANTITATION, 5693
- LIVER NEOPLASMS
  - AGE FACTORS, 5719*
  - NECROSIS, 5719*
  - STRAIN DIFFERENCE, MOUSE, 5719*
- SPERMATOGENESIS
  - IMMUNE RESPONSE, RABBIT, TESTICLES

    - 5694
  - ULTRAVIOLET RAYS
    - DNA REPAIR, 5695
    - XERODERMA PIGMENTOSUM, 5695
  - VENEREAL DISEASES
    - EPIDEMIOLOGY, REVIEW, 5894*

US, HERPES SIMPLEX 2
  - ANTIBODIES, VIRAL
    - IMMUNE RESPONSE, RABBIT, TESTICLES, 5694
  - ANTIBODY FORMATION
    - IMMUNE SERUMS, 5693
    - QUANTITATION, 5693
  - ANTIGENS, VIRAL
    - CELL TRANSFORMATION, NEOPLASTIC, 5691
  - CELL TRANSFORMATION, NEOPLASTIC
    - REVIEW, 5440
  - CERVIX NEOPLASMS
    - ANTIGEN-ANTIBODY REACTIONS, REVIEW, 5515*, 5516*, 5894*
    - CARCINOGENIC POTENTIAL, REVIEW, 5432, 5433, 5438
    - EPIDEMIOLOGY, REVIEW, 5515*, 5894*
    - REVIEW, 5436
    - SEROEPIDEMIOLOGIC STUDY, REVIEW, 5516*
    - ULTRASTRUCTURAL STUDY, REVIEW, 5515*
  - LIVER NEOPLASMS
    - AGE FACTORS, 5719*
    - NECROSIS, 5719*
    - STRAIN DIFFERENCE, MOUSE, 5719*
  - T-LYMPHOCYTES
    - IMMUNE RESPONSE, 5719*
  - SPERMATOGENESIS
    - IMMUNE RESPONSE, RABBIT, TESTICLES, 5694
  - VENEREAL DISEASES
    - EPIDEMIOLOGY, REVIEW, 5894*
  - VIRUS REPLICATION
    - REVIEW, 5440

US, KIRSTEN MURINE SARCOMA
  - VIRUS REPLICATION
    - PHENOTYPIC MIXING, 5706*
  - VIRUS, VESICULAR STOMATITIS
    - PHENOTYPIC MIXING, 5706*

US, LACTATE DEHYDROGENASE
  - T-LYMPHOCYTES
    - IMMUNITY, CELLULAR, 5749

RUS-LIKE PARTICLES
  - BONE NEOPLASMS
    - ISOLATION AND CHARACTERIZATION, REVIEW, 5524*
  - HELA CELLS
    - ULTRASTRUCTURAL STUDY, 5716*
    - VIRUS, MASON-PFIZER MONKEY, 5716*
  - LEUKEMIA L1210
    - ACTINOMYCIN D-RESISTANCE, 5712*
    - ULTRASTRUCTURAL STUDY, 5712*
  - LYMPHOSARCOMA
    - ULTRASTRUCTURAL STUDY, RABBIT, 5823*
  - MAMMARY NEOPLASMS, EXPERIMENTAL
    - BENZ(A)ANTHRACENE, 7,12-DIMETHYL-, 5707*
    - CARCINOMA, 5707*
    - ISOLATION AND CHARACTERIZATION, 5707*
    - VIRUS, MURINE MAMMARY TUMOR, 5707*
  - MELANOMA
    - THEOPHYLLINE, 5834*
    - VIRUS, PARAMYXO, 5834*
  - PLACENTA
    - C-TYPE PARTICLES, 5648
    - ULTRASTRUCTURAL STUDY, RAT, 5648
  - VIRUS, C-TYPE RNA TUMOR
    - PREGNANCY, MOUSE, 5699
    - ULTRASTRUCTURAL STUDY, MOUSE UTERUS, 5699
  - VIRUS, MURINE MAMMARY TUMOR
    - ISOLATION AND CHARACTERIZATION, 5707*
    - ISOLATION AND CHARACTERIZATION, REVIEW, 5514*
  - VIRUS, RADIATION LEUKEMIA
    - RNA, VIRAL, 5658
  - VIRUS, RNA TUMOR
    - EMBRYO, MOUSE, 5711*

VIRUS, MAREK'S DISEASE HERPES
  - DNA, VIRAL
    - BINDING, 5641
    - DNA-RNA HYBRIDIZATION, 5641
  - LYMPHOMA
    - ULTRASTRUCTURAL STUDY, REVIEW, 5504*
  - NEOPLASMS, EXPERIMENTAL
    - BINDING, 5641
  - VIRUS REPLICATION
    - IMMUNE RESPONSE, REVIEW, 5504*
    - ULTRASTRUCTURAL STUDY, REVIEW, 5504*

VIRUS, MASON-PFIZER MONKEY
  - BREAST NEOPLASMS
    - RISK FACTORS, 5536*
    - RNA, 5536*
  - HELA CELLS
    - ANTIGENS, VIRAL, 5716*
    - VIRUS-LIKE PARTICLES, 5716*

VIRUS, MOLONEY MURINE LEUKEMIA
  - CHOLANTHRENE, 3-METHYL-
    - CELL TRANSFORMATION, NEOPLASTIC, 5749
  - T-LYMPHOCYTES
    - IMMUNITY, CELLULAR, 5749
  - LYMPHOMA
    - IMMUNITY, CELLULAR, 5749
  - VIRUS, CHORIOMENINGITIS
    - IMMUNITY, CELLULAR, 5749

VIRUS, MURINE LEUKEMIA
  - ADENOCARCINOMA
    - ANTIGENS, VIRAL, 5710*
  - BURKITT'S LYMPHOMA
    - DNA-RNA HYBRIDIZATION, 5655
  - CELL TRANSFORMATION, NEOPLASTIC
    - ANTIGENIC DETERMINANTS, REVIEW, 5513*
  - DNA, VIRAL
    - DNA-DNA HYBRIDIZATION, 5656
    - VIRUS REPLICATION, 5656

- FERRITIN
  - ANTIGEN-ANTIBODY REACTIONS, 5703*
- FIBROSARCOMA
  - DNA-RNA HYBRIDIZATION, 5655
- GENES
  - VIRUS REPLICATION, 5656
- IMMUNE SERUMS
  - ANTIGEN-ANTIBODY REACTIONS, 5703*
  - VIRUS REPLICATION, 5703*
- POLYCYCLIC HYDROCARBONS
  - CELL TRANSFORMATION, NEOPLASTIC, 5614*
  - VIRUS REPLICATION, 5614*
- SARCOMA, OSTEOGENIC
  - DNA-RNA HYBRIDIZATION, 5655
- VIRUS, MURINE SARCOMA
  - CELL LINE, REVIEW, 5524*
  - HELPER VIRUSES, REVIEW, 5524*
- VIRUS REPLICATION
  - ANTIGENIC DETERMINANTS, REVIEW, 5513*
  - IMMUNE RESPONSE, REVIEW, 5513*

VIRUS, MURINE MAMMARY TUMOR
- BREAST NEOPLASMS
  - RISK FACTORS, 5536*
  - RNA, 5536*
- CELL TRANSFORMATION, NEOPLASTIC
  - STRAIN DIFFERENCE, REVIEW, 5514*
- HORMONES
  - SECRETION, 5781
  - VIRUS REPLICATION, 5781
- MAMMARY NEOPLASMS, EXPERIMENTAL
  - ANTIGENS, NEOPLASM, 5739
  - CYTOTOXICITY TESTS, IMMUNOLOGIC, 5739
- NEOPLASMS, EXPERIMENTAL
  - REVERSE TRANSCRIPTASE, 5663
  - RNA, VIRAL, 5663
- NEURAMINIDASE
  - ANTIGENS, NEOPLASM, 5745
- REVERSE TRANSCRIPTASE
  - ISOLATION AND CHARACTERIZATION, REVIEW, 5514*
- VIRUS-LIKE PARTICLES
  - ISOLATION AND CHARACTERIZATION, 5707*
  - ISOLATION AND CHARACTERIZATION, REVIEW, 5514*
  - MAMMARY NEOPLASMS, EXPERIMENTAL, 5707*

VIRUS, MURINE SARCOMA
- BONE NEOPLASMS
  - ISOLATION AND CHARACTERIZATION, REVIEW, 5524*
- BURKITT'S LYMPHOMA
  - DNA-RNA HYBRIDIZATION, 5655
- CELL TRANSFORMATION, NEOPLASTIC
  - ANTIGENIC DETERMINANTS, REVIEW, 5513*
- FIBROSARCOMA
  - DNA-RNA HYBRIDIZATION, 5655
- GLUCOSEPHOSPHATE DEHYDROGENASE
  - CELL TRANSFORMATION, NEOPLASTIC, 5662
  - CONTACT INHIBITION, 5662
- HEXOKINASE
  - CELL TRANSFORMATION, NEOPLASTIC, 5662
  - CONTACT INHIBITION, 5662
- PHOSPHOFRUCTOKINASE
  - CELL TRANSFORMATION, NEOPLASTIC, 5662
  - CONTACT INHIBITION, 5662
- PHOSPHOGLUCONATE DEHYDROGENASE
  - CELL TRANSFORMATION, NEOPLASTIC, 5662
  - CONTACT INHIBITION, 5662
- RECEPTORS, HORMONE
  - CELL TRANSFORMATION, NEOPLASTIC, 5926
- SARCOMA, OSTEOGENIC
  - DNA-RNA HYBRIDIZATION, 5655
- VIRUS, MURINE LEUKEMIA
  - CELL LINE, REVIEW, 5524*
  - HELPER VIRUSES, REVIEW, 5524*
- VIRUS REPLICATION
  - ANTIGENIC DETERMINANTS, REVIEW, 5513*
  - IMMUNE RESPONSE, REVIEW, 5513*

VIRUS, PAPILLOMA
- CONDYLOMATA ACUMINATA
  - EPIDEMIOLOGY, 5681
- LARYNGEAL NEOPLASMS
  - EPIDEMIOLOGY, 5681
- SKIN NEOPLASMS
  - EPIDEMIOLOGY, CHILD, 5880
- WARTS
  - DNA-RNA HYBRIDIZATION, 5681
  - EPIDEMIOLOGY, 5681

VIRUS, PARAMYXO
- IMMUNE SERUMS
  - CONTAMINATION, HUMAN CELL CULTURE 5680
- MELANOMA
  - VIRUS-LIKE PARTICLES, 5834*

VIRUS, PICORNA
- RNA, VIRAL
  - OLIGONUCLEOTIDES, 5720*
  - POLY A, 5720*

VIRUS, POLIO
- RNA, VIRAL
  - OLIGONUCLEOTIDES, 5720*

VIRUS, POLYOMA
- CELL TRANSFORMATION, NEOPLASTIC
  - HISTOLOGICAL STUDY, REVIEW, 5517*
- DNA REPLICATION
  - TEMPERATURE SENSITIVE MUTANTS, 5678
- DNA, VIRAL
  - CELL CYCLE KINETICS, 5678
- GALACTOSE
  - CELL TRANSFORMATION, NEOPLASTIC, 5939*
  - METABOLISM, 5939*
- URIDINE
  - METABOLISM, 5939*
- VIRUS, ADENO 2
  - ANTIGENS, VIRAL, 5684
  - VIRUS REPLICATION, 5684
- VIRUS REPLICATION
  - IMMUNE RESPONSE, REVIEW, 5517*

- IRUS, RADIATION LEUKEMIA
  - RNA, VIRAL
    - DNA-RNA HYBRIDIZATION, 5658
    - ISOLATION AND CHARACTERIZATION, 5658
    - REVERSE TRANSCRIPTASE, 5658
    - VIRUS-LIKE PARTICLES, 5658

- IRUS, RAUSCHER MURINE LEUKEMIA
  - ANTIGENS, VIRAL
    - ISOLATION AND CHARACTERIZATION, 5660
  - CHROMOSOMES
    - VIRUS REPLICATION, 5704*
  - HYBRID CELLS
    - VIRUS REPLICATION, 5704*
  - NEOPLASMS, EXPERIMENTAL
    - REVERSE TRANSCRIPTASE, 5663
    - RNA, VIRAL, 5663
  - RNA, VIRAL
    - PEPTIDES, 5661
    - TRANSLATION, HETEROLOGOUS CELL-FREE SYSTEM, 5661
    - VIRAL PROTEINS, 5661
  - VIRUS REPLICATION
    - PHENOTYPIC MIXING, 5706*
  - VIRUS, VESICULAR STOMATITIS
    - PHENOTYPIC MIXING, 5706*

- IRUS, RD-114
  - BURKITT'S LYMPHOMA
    - DNA-RNA HYBRIDIZATION, 5655
  - FIBROSARCOMA
    - DNA-RNA HYBRIDIZATION, 5655

- IRUS REPLICATION
  - HEPATOMA
    - AUSTRALIA ANTIGEN, 5722*
  - LYMPHOMA
    - VIRUS, GROSS MURINE LEUKEMIA, 5659
  - TERATOID TUMOR
    - VIRUS, ADENO 2, 5684
  - VIRUS, ADENO 12
    - RNA, VIRAL, 5687
  - VIRUS, ADENO 2 - SV40 HYBRID
    - VIRAL PROTEINS, 5677
  - VIRUS, AVIAN LEUKEMIA
    - REVIEW, 5506*
  - VIRUS, AVIAN LEUKOSIS
    - IMMUNITY, CELLULAR, 5701*
    - T-LYMPHOCYTES, 5701*
  - VIRUS, AVIAN LEUKOSIS-SARCOMA
    - REVIEW, 5506*
  - VIRUS, AVIAN MYELOBLASTOSIS
    - REVERSE TRANSCRIPTASE, REVIEW, 5503*
  - VIRUS, AVIAN SARCOMA
    - TEMPERATURE SENSITIVE MUTANTS, REVIEW, 5508*
  - VIRUS, C-TYPE
    - B-LYMPHOCYTES, 5713*
    - MITOGENS, 5713*
  - VIRUS, C-TYPE RNA TUMOR
    - POLYCYCLIC HYDROCARBONS, 5614*
  - VIRUS, DNA TUMOR
    - REVIEW, 5519*
  - VIRUS, EPSTEIN-BARR
    - REVIEW, 5440
  - VIRUS, FELINE LEUKEMIA
    - IMMUNE RESPONSE, REVIEW, 5512*
    - ULTRASTRUCTURAL STUDY, REVIEW, 5512*
  - VIRUS, HERPES SIMPLEX 2
    - REVIEW, 5440
  - VIRUS, KIRSTEN MURINE SARCOMA
    - PHENOTYPIC MIXING, 5706*
  - VIRUS, MAREK'S DISEASE HERPES
    - IMMUNE RESPONSE, REVIEW, 5504*
    - ULTRASTRUCTURAL STUDY, REVIEW, 5504*
  - VIRUS, MURINE LEUKEMIA
    - ANTIGENIC DETERMINANTS, REVIEW, 5513*
    - DNA, VIRAL, 5656
    - GENES, 5656
    - IMMUNE RESPONSE, REVIEW, 5513*
    - IMMUNE SERUMS, 5703*
    - POLYCYCLIC HYDROCARBONS, 5614*
  - VIRUS, MURINE MAMMARY TUMOR
    - HORMONES, 5781
  - VIRUS, MURINE SARCOMA
    - ANTIGENIC DETERMINANTS, REVIEW, 5513*
    - IMMUNE RESPONSE, REVIEW, 5513*
  - VIRUS, POLYOMA
    - IMMUNE RESPONSE, REVIEW, 5517*
    - VIRUS, ADENO 2, 5684
  - VIRUS, RAUSCHER MURINE LEUKEMIA
    - CHROMOSOMES, 5704*
    - HYBRID CELLS, 5704*
    - PHENOTYPIC MIXING, 5706*
  - VIRUS, RNA TUMOR
    - REVIEW, 5520*
  - VIRUS, ROUS SARCOMA
    - REVIEW, 5506*
  - VIRUS, SV40
    - DNA REPLICATION, 5669
    - DNA, VIRAL, 5669, 5670
    - VIRUS, ADENO 2, 5684
  - VIRUS, VESICULAR STOMATITIS
    - PHENOTYPIC MIXING, 5706*

- VIRUS, RNA TUMOR
  - ANTIGENIC DETERMINANTS
    - IMMUNE RESPONSE, 5520*
  - BREAST NEOPLASMS
    - CARCINOGENIC POTENTIAL, REVIEW, 5432
  - CELL TRANSFORMATION, NEOPLASTIC
    - EPIDEMIOLOGY, REVIEW, 5432
    - REVIEW, 5520*
  - RNA REPLICATION
    - EMBRYO, MOUSE, 5711*
  - VIRUS-LIKE PARTICLES
    - EMBRYO, MOUSE, 5711*
  - VIRUS REPLICATION
    - REVIEW, 5520*

- VIRUS, ROUS SARCOMA
  - ACTINOMYCIN D
    - GLUCOSE, 2-DEOXY-, 5645
  - ANTIGENS, NEOPLASM
    - ISOLATION AND CHARACTERIZATION, 5505*
  - BENZO(A)PYRENE
    - VIRAL VACCINES, 5566
  - CELL TRANSFORMATION, NEOPLASTIC
    - REVIEW, 5506*

- CHOLANTHRENE, 3-METHYL-
    - VIRAL VACCINES, 5566
- CYCLOHEXIMIDE
    - GLUCOSE, 2-DEOXY-, 5645
- DNA, VIRAL
    - CELL TRANSFORMATION, NEOPLASTIC, 5646
    - CYTOPATHOGENIC EFFECT, VIRAL, 5646
    - ISOLATION AND CHARACTERIZATION, FIBROBLASTS, 5647
    - OLIGONUCLEOTIDES, 5647
    - REVIEW, 5646
    - TRANSFORMATION-DEFECTIVE MUTANTS, 5646
    - TRANSFORMATION, GENETIC, 5646
- FIBROBLASTS
    - MICROTUBULES, 5775*
- FORMALDEHYDE
    - CARCINOGENESIS, CHEMICAL, 5566
- GALACTOSE
    - CELL TRANSFORMATION, NEOPLASTIC, 5645
- GLUCOSE, 2-DEOXY-
    - CELL TRANSFORMATION, NEOPLASTIC, 5645
- HEXOSES
    - METABOLISM, 5645
    - TEMPERATURE SENSITIVE MUTANTS, 5645
- LEUCINE
    - CELL TRANSFORMATION, NEOPLASTIC, 5645
- METHANE, SULFINYLBIS-
    - CARCINOGENESIS, CHEMICAL, 5566
- MICROTUBULES
    - CELL TRANSFORMATION, NEOPLASTIC, 5775*
- NUCLEOSIDES
    - METABOLISM, 5645
    - TEMPERATURE SENSITIVE MUTANTS, 5645
- PHOSPHODIESTERASES
    - CELL TRANSFORMATION, NEOPLASTIC, 5644
- PROTEINS
    - CELL TRANSFORMATION, NEOPLASTIC, 5644
- THYMIDINE
    - CELL TRANSFORMATION, NEOPLASTIC, 5645
- URIDINE
    - CELL TRANSFORMATION, NEOPLASTIC, 5645
- VIRUS, AVIAN LEUKOSIS-SARCOMA
    - ANTIGENIC DETERMINANTS, 5642
- VIRUS REPLICATION
    - REVIEW, 5506*

VIRUS, SENDAI
- HELA CELLS
    - CELLS, CULTURED, 5962*
- RNA, TRANSFER
    - CELL FUSION, 5698
    - ERYTHROCYTES, 5698

VIRUS, SIMIAN SARCOMA
- BURKITT'S LYMPHOMA
    - DNA-RNA HYBRIDIZATION, 5655
- FIBROSARCOMA
    - DNA-RNA HYBRIDIZATION, 5655
- NEOPLASMS, EXPERIMENTAL
    - REVERSE TRANSCRIPTASE, 5663
    - RNA, VIRAL, 5663
- SARCOMA, OSTEOGENIC
    - DNA-RNA HYBRIDIZATION, 5655

VIRUS, SV40
- ANTIGENS, VIRAL
    - CELL TRANSFORMATION, NEOPLASTIC, 5667
    - RNA, MESSENGER, 5667
- BENZO(A)PYRENE
    - DNA REPLICATION, 5666
- BUTYRIC ACID, 2-AMINO-4-MERCAPTO-
    - METHIONINE, 5936*
- CAFFEINE
    - CELL TRANSFORMATION, NEOPLASTIC, 5668
- CELL ADHESION
    - CELL TRANSFORMATION, NEOPLASTIC, 5715*
    - TEMPERATURE SENSITIVE MUTANTS, 5715*
- CELL MEMBRANE
    - CELL TRANSFORMATION, NEOPLASTIC, 5715*
    - TEMPERATURE SENSITIVE MUTANTS, 5715*
- CELL TRANSFORMATION, NEOPLASTIC
    - CELL CYCLE KINETICS, 5668
    - CHROMOSOMES, 5672
    - CLONE CELLS, 5714*
    - DNA, 5672
    - DOSE-RESPONSE STUDY, 5668
    - FIBROBLASTS, 5672
    - FIBROBLASTS, MOUSE, 5673
    - IMMUNOSUPPRESSION, 5671
    - MOUSE, NUDE, 5714*
    - TISSUE CULTURE, 5671
- CHROMOSOMES
    - PROTEINS, 5672
- DNA REPLICATION
    - VIRUS REPLICATION, 5669
- DNA, VIRAL
    - DNA-DNA HYBRIDIAZATION, 5670
    - ENDONUCLEASES, 5675
    - ISOLATION AND CHARACTERIZATION, 5670
    - VIRAL PROTEINS, 5675
    - VIRUS REPLICATION, 5669, 5670
- ESTRADIOL
    - DNA REPLICATION, 5666
- GUANIDINE, 1-METHYL-3-NITRO-1-NITROS
    - DNA REPLICATION, 5666
- IMMUNOSUPPRESSION
    - CELL MIXTURES, 5776*
- ISOBUTYRIC ACID, ALPHA-AMINO-
    - CELL TRANSFORMATION, NEOPLASTIC, 5673, 5674
- KETONES
    - ANTIGENS, VIRAL, 5667
- METHIONINE
    - CELL TRANSFORMATION, NEOPLASTIC, 5936*
- METHYLTRANSFERASES
    - METHIONINE, 5936*
- NEOPLASM TRANSPLANTATION
    - CELL MIXTURES, 5776*

- RADIATION, IONIZING
  - CELL MIXTURES, 5776*
  - CELL TRANSFORMATION, NEOPLASTIC, 5668
- RECEPTORS, HORMONE
  - CELL TRANSFORMATION, NEOPLASTIC, 5926
- TRANSPLANTATION IMMUNOLOGY
  - CELL MIXTURES, 5776*
- VIRAL PROTEINS
  - ENDONUCLEASES, 5675
- VIRUS, ADENO 2
  - ANTIGENS, VIRAL, 5684
  - VIRUS REPLICATION, 5684
- VIRUS, CYTOMEGALO
  - VIRAL VACCINES, 5692
- VIRUS, HERPES SIMPLEX
  - VIRAL VACCINES, 5692

RUS, VACCINIA
- DNA, VIRAL
  - ISOLATION AND CHARACTERIZATION, 5721*
- ETHANOL, 2-MERCAPTO-
  - DNA, VIRAL, 5721*
- GRAFT VS HOST REACTION
  - REVIEW, 5742
- HELA CELLS
  - DNA REPLICATION, 5679

RUS, VESICULAR STOMATITIS
- RNA, VIRAL
  - OLIGONUCLEOTIDES, 5720*
- VIRUS, KIRSTEN MURINE SARCOMA
  - PHENOTYPIC MIXING, 5706*
- VIRUS, RAUSCHER MURINE LEUKEMIA
  - PHENOTYPIC MIXING, 5706*
- VIRUS REPLICATION
  - PHENOTYPIC MIXING, 5706*

TAMIN D
- AFLATOXIN B1
  - REVIEW, 5413

RTS
- SKIN NEOPLASMS
  - EPIDEMIOLOGY, CHILD, 5880
- VIRUS, PAPILLOMA
  - DNA-RNA HYBRIDIZATION, 5681
  - EPIDEMIOLOGY, 5681

TER POLLUTANTS
- NEOPLASMS
  - CHLOROFORM, 5897*
  - EPIDEMIOLOGY, 5897*
  - EPIDEMIOLOGY, OHIO, 5896*

UND INFECTION
- MELANOMA
  - SUTURES, 5637*

ANTHINE, METHYL-
- HELA CELLS
  - CELL CYCLE KINETICS, 5898*

XANTHINE OXIDASE
- 2-FURALDEHYDE, 5-NITRO-, SEMICARBAZONE
  - REDUCTION PRODUCTS, ISOLATION AND CHARACTERIZATION, 5546

XENOPUS LAEVUS
- ESTRADIOL
  - LIPOPROTEINS, 5954*

XERODERMA PIGMENTOSUM
- ACETAMIDE, N-[ACETYLOXY]-N-9H-FLUOREN-2-YL-
  - DNA REPAIR, 5622
- CARCINOGEN, CHEMICAL
  - DNA REPAIR, REVIEW, 5498*
- CELL FUSION
  - DNA REPAIR, REVIEW, 5498*
- CELL TRANSFORMATION, NEOPLASTIC
  - DNA REPAIR, REVIEW, 5498*
- DNA REPAIR
  - COLONY FORMATION, 5639*
- LIGHT
  - DNA REPAIR, 5624
- METHANESULFONIC ACID, ETHYL ESTER
  - DNA REPAIR, 5622
- RADIATION, IONIZING
  - DNA REPAIR, 5622
- ULTRAVIOLET RAYS
  - AZAGUANINE RESISTANCE, 5630*
  - COLONY FORMATION, 5639*
  - DNA REPAIR, 5622, 5624, 5630* 5639*
  - DNA REPAIR, REVIEW, 5498*
- VIRUS, HERPES SIMPLEX 1
  - ULTRAVIOLET RAYS, 5695

YEASTS
- AMINO ACIDS
  - RNA REPLICATION, 5977*
- CYCLOHEXIMIDE
  - RNA REPLICATION, 5977*

CHEMICAL ABSTRACT SERVICES REGISTRY NUMBER INDEX

REGISTRY NUMBER	ABSTRACT NUMBER	CAS REGISTRY NUMBER	ABSTRACT NUMBER
0000	5426, 5566	54422	5583
0022	5924, 5925	54886	5579
0033	5552	55174	5579
0066	5421, 5565, 5571, 5572	55185	5403, 5411, 5577, 5579, 5907
0077	5794	55801	5403, 5547
0237	5552, 5560, 5561	56235	5403
0271	5417	56406	5924
0282	5551, 5552, 5553, 5666, 5922	56495	5548, 5565, 5569, 5571, 5572, 5573, 5741, 5797
0293	5405	56531	5415, 5436, 5556, 5922
0328	5567, 5569, 5572	56553	5548, 5570
0442	5805	56575	5425
50555	5414, 5558	56757	5925
50760	5426, 5645	57410	5742
50895	5645, 5911	57578	5586
51218	5407, 5794	57830	5552, 5922
51525	5553	57976	5410, 5548, 5562, 5563, 5564, 5569
51796	5411, 5585	58082	5668
53703	5548, 5569	58220	5552, 5559
53792	5727	58559	5730, 5918
53952	5410	58968	5645, 5911
53963	5403	59143	5919
54364	5571		

CHEMICAL ABSTRACT SERVICES REGISTRY NUMBER INDEX

CAS REGISTRY NUMBER	ABSTRACT NUMBER
59234	5645
59461	5561
59870	5546
59892	5411
59927	5792
60117	5735
60560	5553
61574	5591
61905	5645
62555	5551
62680	5572, 5592
62759	5411, 5573, 5574, 5575, 5576, 5578, 5579, 5580
63252	5411
64175	5593
66273	5426, 5586, 5588
66819	5550, 5645, 5924, 5925
67210	5579
67685	5566, 5916
68122	5916
68268	5413
70257	5411, 5581, 5582, 5583, 5666, 5803
75014	5403, 5405, 5421, 5592 5871
87661	5568
90653	5422
100754	5411, 5580
111024	5568
112801	5568
115264	5574
120809	5568
124185	5568
127071	5903, 5925
129000	5568
133062	5420
133073	5420
137268	5574
151677	5741
154176	5645
215587	5569
443481	5590
480228	5568
518752	5578
521186	5552

CHEMICAL ABSTRACT SERVICES REGISTRY NUMBER INDEX

S REGISTRY NUMBER	ABSTRACT NUMBER	CAS REGISTRY NUMBER	ABSTRACT NUMBER
526830	5804	2163691	5574
531759	5568	2654650	5562
540614	5421	3034386	5590
551928	5590	3034422	5590
568752	5562	5297927	5590
598550	5411	5625489	5673, 5674, 5924
601874	5792	6051872	5571
604591	5571	6098448	5550, 5622
615532	5411	6893023	5553, 5554
637070	5547	7440382	5407
684935	5411, 5576, 5586, 5588, 5589	7488702	5553, 5554, 5923
696231	5590	7647145	5473, 5582, 5674
759739	5411, 5589	7681494	5730, 5915
908350	5571	7782776	5426, 5574, 5580
930552	5411, 5580	9002077	5682
162658	5403, 5413	9002624	5469, 5559, 5560, 5561
239458	5925	9004108	5560, 5561, 5924, 5926
314201	5625	9005792	5799
406162	5413, 5471	9008111	5653
464535	5586	13569965	5592
746016	5571	16354475	5563
982474	5574	16561298	5404, 5568

CHEMICAL ABSTRACT SERVICES REGISTRY NUMBER INDEX

CAS REGISTRY NUMBER	ABSTRACT NUMBER
18888567	5590
23246960	5418
24096535	5578
26241634	5404
26782434	5416
27815787	5667
33953730	5410

ABSTRACT NUMBER

.... 5407

.F 5730, 5915

.G 5473, 5582, 5674

.02 5625

OR DMVN1&1 5574

YR DG&R DG 5405

G 5403

FFF 5741

.... 5403, 5405, 5421, 5592, 5871

YUS&S 2 5574

56 HHJ EMV1 5403

56 HHJ ENQV1 5410

66J BQ DQ NQ 5568

B666J 5548, 5570

B666J C J 5410, 5548, 5562, 5563, 5564, 5569

B666J C J01 5563

B666J C J1Q 5562

B6666 2AB TJ 5567, 5569, 5572

J6 C666J 5569

B675 MV IU NUTJ BQ C1 DQ EQ F1 F1
Q LQ N1.. 5404

WLN ABSTRACT NUMBER

L E5 B666 OV MUTJ A CQ E FV1Q FQ -B&ACEF.. 5552, 5560, 5561

L E5 B666 OV MUTJ A E FQ -B&AEF 5552, 5559

L E5 B666 OV MUTJ A E FV1 -B&AEF 5552, 5922

L E5 B666TTT&J E FQ GQ OQ 5417

L E5 B666TTT&J E FQ OQ 5551, 5552, 5553, 5666, 5922

L E6 D6656 1A T&&&T&J R 5548, 5565, 5569, 5571, 5572, 5573, 5741, 5797

L G6 D6 B666J 5548, 5569

L6UTJ A BL/U1Y&U2/ 2Q C C -T 5413

L66J BOVM1 5411

L666 B6 2AB PJ 5568

L8TJ AMVN1&1 5574

ONN1&VMV1 5587

ONN1&V02 5411

ONN1&1 .... 5411, 5573, 5574, 5575, 5576, 5578, 5579, 5580

ONN2&2 .... 5403, 5411, 5577, 5579, 5907

ONO 5426, 5574, 5580

OS1&1 .... 5566, 5916

QR BQ 5568

WISWESSER LINE NOTATION INDEX

WLN	ABSTRACT NUMBER
QR BQ CQ	5568
QR DY2& 2U	5415, 5436, 5556, 5922
QVYQYQVQ & 2 &621 T6NJ C1 2/XV/ &622	5571
QVYZ1R CQ DQ -L	5792
QVYZ1Y -L	5645
QVYZ2S2	5579
QVYZ2S2 -DL	5579
QV1UYO1&VYU1	5422
QV8U9 -C	5568
Q2	5593
T C666 BO EV INJ D FV N G-K-/VM- OT5-16- AN FVN IVN LVO PVM SVTJ G J KY N RY 2	5426, 5645
T D3 B556 BN EM JV MVTTT&J GO1 H1OVZ KZ L	5794
T F5 C6 B655 DOV G V OO QO RUT&&TTJ LO1	5403, 5413
T F6 D5 C666 EM ON&&TTTJ HO1 SOVR CO1 DO1 EO1& TO1 UVO1	5414, 5558
T3OTJ B- 2	5586
T4OVTJ	5586
T5MVMV EHJ ER& ER	5742
T5N CNJ A B ENW	5590
T5N CSJ DNW B- C+5MVNTJ	5591

WLN	ABSTRACT NUMB
T5NTJ ANO	5411, 5580
T5OJ BNW E1UNMVZ	5546
T56 BM DN FN HNJ ISH	5805
T56 BM DN FNVNVJ F H	5730, 5918
T56 BN DN FN HNJ IN1&1 D- BT5OTJ CQ DMVYZ1R DO1& E1Q	5727
T56 BN DN FNVNVJ B F H	5668
T56 BVNV GUTJ CSXGGG	5420
T56 BVNVJ CSXGGG	5420
T6MVMVJ EF	5407, 5794
T6MYMVJ BUS F3	5553
T6N DOTJ ANO	5411
T6NTJ ANO	5411, 5580
T6NVMVJ EE A- ET5OTJ B1Q CQ -A&C	5919
T6NVMVJ EI A- ET5OTJ B1Q CQ A&C	5583
T6VMVMV FHJ F2 FR	5421, 5565, 5572
T6VMVTJ E1YQ- BL6VTJ D F	5550, 5645, 5925
T66 BNJ BO ENW	5425
T66 CO HV AUT&J D E G IVQ JQ	5578
VHH	5426, 5566
VHN1&1	5916
VH1YQYQYQ1Q -BAA -D	5645

WISWESSER LINE NOTATION INDEX

WLN	ABSTRACT NUMBER
MYUM&N1&NO	5411, 5581, 5582, 5583, 5666, 5803
R DYQY1QMVYGG -DL	5925
1&O1	5426, 5586, 5588
US	5551
DVO2N2&2	5561
N1&NO	5411, 5576, 5586, 5588, 5589
N2&NO	5411, 5589
O1	5411
O2	5411, 5585
CN	5421
1&PO&FN1&1	5574
1&R C DNUNR	5579
1&R DNUNR	5735
1&R DNUNR C	5403, 5547
R&RVO2N2&2 &GH	5572, 5592

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National Cancer Institute

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PREFACE

Carcinogenesis Abstracts is a publication of the National Cancer Institute. The journal serves as a vehicle through which current documentation of carcinogenesis research highlights are compiled, condensed, and disseminated on a regular basis. It represents an integral part of the Institute's program of fostering and supporting coordinated research into cancer etiology. Issues of *Carcinogenesis Abstracts* normally contain three-hundred abstracts and three-hundred citations (unaccompanied by corresponding abstracts). Abstracts and citations refer to the current scientific literature that describes the most significant carcinogenesis research carried on at the National Cancer Institute, other governmental agencies, and private institutions. *Carcinogenesis Abstracts* is intended to be a highly useful current awareness tool for scientists engaged in carcinogenesis research or related areas. The great number and diversity of publications relevant to carcinogenesis make imperative the availability of this service to investigators whose work requires that they keep abreast with current developments in the field.

Carcinogenesis Abstracts is normally published monthly. Volume XIV covers the scientific literature published from Jan 1976 through Dec 1976. To increase the usefulness of *Carcinogenesis Abstracts*, Volume XIV, a Wiswesser Line Notation index and a Chemical Abstracts Service Registry Number index have been provided. These indexes reference compounds described in abstracted articles. A cumulative subject, author, CAS Registry Number, and Wiswesser Line Notation index for Volume XIV will be published shortly after the final regular issue.

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NOTE

Journal names are abbreviated according to the list of abbreviations used by *Index Medicus*. For journals not covered by *Index Medicus*, the abbreviations found in *Chemical Abstracts Service Source Index*, 1907-1974 Cumulative, are used. New journals are verified in *New Serial Titles* and abbreviated according to *International Standard ISO 833*. An asterisk indicates the author to address (other than the primary) in requesting reprints.

LANGUAGE ABBREVIATIONS

Afr.	Afrikaans
Ara.	Arabic
Bul.	Bulgarian
Chi.	Chinese
Cro.	Croation
Cze.	Czech
Dan.	Danish
Dut.	Dutch
Eng.	English
Est.	Estonian
Fin.	Finnish
Fle.	Flemish
Fre.	French
Geo.	Georgian
Ger.	German
Gre.	Greek
Heb.	Hebrew
Hun.	Hungarian
Ice.	Icelandic
Ind.	Indonesian
Ita.	Italian
Jpn.	Japanese
Kor.	Korean
Lav.	Latvian
Lit.	Lithuanian
Nor.	Norwegian
Pol.	Polish
Por.	Portuguese
Rum.	Rumanian
Rus.	Russian
Ser.	Serbo-Croatian
Slo.	Slovak
Spa.	Spanish
Swe.	Swedish
Tha.	Thai
Tur.	Turkish
Ukr.	Ukrainian
Vie.	Vietnamese

ABBREVIATIONS USED IN ABSTRACTS

A	angstrom(s)
ACTH	adrenocorticotropic hormone
ADP	adenosine diphosphate
AMP	adenosine monophosphate
ATP	adenosine triphosphate
approx	approximately
av	average
BCG	bacillus Calmette-Guerin
bid	twice daily
C	degree(s) centigrade
cal	calorie(s)
kcal	kilocalorie(s)
cc	cubic centimeter(s)
Ci	curie(s)
mCi	millicurie(s)
µCi	microcurie(s)
cm	centimeter(s)
CNS	central nervous system
cpm	counts per minute
DNA	deoxyribonucleic acid
ED_{50}	median effective dose
EDTA	ethylenediamine tetraacetic acid
g	gram(s)
kg	kilogram(s)
mg	milligram(s)
µg	microgram(s)
Hb	hemoglobin
hr	hour(s)
ia	intra-arterial
id	intradermal
ILS	increased life span
im	intramuscular
ip	intraperitoneal
IU	International Unit(s)
iv	intravenous
Km	Michaelis constant
LD	lethal dose
LD_{50}	median lethal dose
M	molar
µM	micromolar
mOsm	milliosmolar
max	maximum
mEq	milliequivalent(s)
min	minute(s)
ml	milliliter
µl	microliter(s)
mm	millimeter(s)
mo	month(s)
N	normal concentration
NAD	nicotinamide adenine dinucleotide
NADH	reduced nicotinamide adenine dinucleoti
NADP	nicotinamide adenine dinucleotidephosph
NADPH	reduced nicotinamide adenine dinucleoti phosphate
NCI	National Cancer Institute
NIH	National Institutes of Health
PAS	periodic acid--Schiff
po	orally
ppb	parts per billion
ppm	parts per million
R	roentgen
RBC	red blood cells (erythrocytes)
RNA	ribonucleic acid
rpm	revolutions per minute
sc	subcutaneous
sec	second(s)
SGOT	serum glutamic-oxalacetic transaminase
SGPT	serum glutamic-pyruvic transaminase
soln	solution
TCD	tissue culture dose
TCD_{50}	median tissue culture dose
tid	three times daily
UV	ultraviolet
WBC	white blood cells (leukocytes)
wk	week(s)
wt	weight
x	times
yr	year(s)

CONTENTS

	Cross Reference Abbreviations	Abstracts, Citations	Page
REVIEW	(Rev)	6001-6137	935
CHEMICAL CARCINOGENESIS	(Chem)	6138-6231	950
PHYSICAL CARCINOGENESIS	(Phys)	6232-6276	962
VIRAL CARCINOGENESIS	(Viral)	6277-6342	967
IMMUNOLOGY	(Immun)	6343-6393	980
PATHOGENESIS	(Path)	6394-6490	991
EPIDEMIOLOGY AND BIOMETRY	(Epid-Biom)	6491-6537	1004
MISCELLANEOUS	(Misc)	6538-6600	1012

AUTHOR INDEX..

SUBJECT INDEX...

CHEMICAL ABSTRACT SERVICES REGISTRY NUMBER INDEX......................

WISWESSER LINE NOTATION INDEX...

NASAL CANCER IN THE FURNITURE AND BOOT AND SHOE MANUFACTURING INDUSTRIES. (Eng.)
son, E. D. (Dept. Medicine, Univ. Southampton,
Block, Southampton General Hosp., Tremona
, Southampton SO9 4XY, England). *Prev Med* 5(2):
315; 1976.

literature published between 1966 and 1976
ing with the risk of nasal cancer in woodworkers
e furniture industry and workers in boot and
manufacturing is reviewed. In both groups there
erwhelming evidence that the causative factor
or associated with particles of dust. In the
r case the dust comes principally from hard-
, in the latter from leather, fiberboard, rub-
and cork. The existence of wood fibers in fiber-
may represent a link between these two indus-
tumors. However, the fact that in the furniture
stry almost all the tumors are adenocarcinomas,
in the boot and shoe industry a wide range of
logical varieties occurs, may indicate that the
tive factors are different. The environmental
itions that gave rise to cases of intranasal
r (reported herein) existed many years ago and
ot still exist. (4 references)

OCCUPATIONAL MALIGNANT TUMORS OF THE SKIN. (Ger.) Haufstein, U.-F. (Hautklinik, Karl-
Universitaet, DDR-701 Leipzig, Liebigstr. 21,
Germany). *Dermatol Monatsschr* 161(10): 791-806;

is massive review the theoretical bases of car-
enesis; the known chemical and physical car-
ens and their properties and mechanisms; the
iology of occupational exposure; the effect
drocarbons, arsenic, UV and ionizing radia-
and trauma (mechanical, thermal, radioactive,
emical); the clinical picture of occupation
cancer; and the technical, hygienic, medical,
egal measures for prophylaxis are discussed.
eferences)

SMOKING AND OCCUPATIONAL CANCERS. (Eng.) Hoffmann, D. (Naylor Dana Inst. Disease
tion, American Health Foundation, Valhalla, NY
; Wynder, E. L. *Prev Med* 5(2): 245-261; 1976.

iological evidence that tobacco use has an
effect to that of occupational carcinogens is
ed. There is a lack of epidemiological data
e joint reaction of occupational carcinogens
bacco smoke. This applies particularly to
s in nickel refineries, coke oven and gas
s, and for workers in the chemical industries
d to halo ethers and vinyl chloride and cer-
rinary carcinogens. Synergistic and/or additive
s of occupational carcinogens and tobacco
are epidemiologically established in the areas
osure to radon daughters and to some types of
os. Experimental evidence of syncarcinogenic
cocarcinogenic effects of tobacco smoke and
ational carcinogens is needed in the areas of
carcinogenesis of nickel, chromium, arsenicals, vinyl chloride, and halo ethers. The latter, however, are very potent respiratory carcinogens by themselves. Similarly, the aromatic amines as potent industrial bladder carcinogens may be studied for cocarcinogenic mechanisms with tobacco smoke constituents. Epidemiological studies in occupational cancer must include the smoking histories in order to determine the relative contribution of causative factors. Furthermore, it is the heavy cigarette smoker who is most likely to be the first affected by traces of carcinogens. (105 references)

6004 POLYCYCLIC AROMATIC HYDROCARBONS IN MINERAL OIL, TAR, AND PITCH, EXCLUDING PETROLEUM PITCH. (Eng.) Kipling, M. D. (Employment Medical Advisory Service, Birmingham, England); Waldron, H. A. *Prev Med* 5(2): 262-278; 1976.

The carcinogencity of polycyclic aromatic hydrocarbons (PAH), which occur naturally in coal and petroleum and in some fossilized woods, peat, and lignite, is reviewed. Pitch, tar, and soot also contain PAH, and these substances may induce skin tumors in those exposed to them occupationally. Soot was the first substance to be indicated as an occupational carcinogen, but it is relatively unimportant now compared with pitch, tar, and mineral oil. Exposure to mineral oil is the cause of most cases of scrotal cancer in the Birmingham (United Kingdom) region. In addition, there is a statistically significant excess of second primary tumors of the bronchus in men with a first primary tumor of the scrotum that appears to be related to their exposure to mineral oil. Benzo(a)pyrene is the most important carcinogen in soot; the carcinogenicity of crude oils seems to reside in the additive effects of a number of weak carcinogens, 4- or 5-ringed PAH. New products may be generated by cracking. The carcinogenicity of mineral oils can be modified by solvent extraction. (111 references)

6005 THE RISK OF CONSUMERS AND PVC WORKERS TO VINYL CHLORIDE. (Ger.) Schlatter, Ch. (Institut fuer Toxikologie, Schorenstrasse 16, CH-8603 Schwerzenbach bei Zurich, Switzerland. *Schweiz Med Wochenschr* 106(19): 647-650; 1976.

The signs and symptoms of vinyl chloride intoxication, the epidemiology of hepatic hemangiosarcoma, the results of animal experimentation, current estimates of occupational risk, and the danger of polyvinyl chloride packaging to the general population are topically reviewed. (10 references)

6006 A REVIEW OF THE CARCINOGENICITIES OF NICKEL, CHROMIUM AND ARSENIC COMPOUNDS IN MAN AND ANIMALS. (Eng.) Sunderman, F. W. (Dept. Lab. Medicine, Univ. Connecticut Sch. Medicine, P.O. Box G, Farmington, CT 06032). *Prev Med* 5(2): 279-294; 1976.

The carcinogenicities of nickel, chromium, and arsenic in man and animals are reviewed. Increased incidences of respiratory tract cancers have been reported among workers in nickel refineries; industrial workers engaged in the production of chromates or in the processing of chrome pigments; and workers with diverse exposure to arsenic compounds (metallurgical, chemical, and agricultural workers). Human subjects who have developed clinical manifestations of arsenicalism as a result of environmental, occupational, or iatrogenic exposures have been reported to have increased incidences of cancers of the skin and possibly of internal organs. Certain nickel and chromium compounds (e.g., nickel, subsulfide, and calcium chromate) administered to rodents by parenteral or respiratory routes have induced cancers at the deposition sites. Experimental induction of cancers in animals has not been reported as a consequence of administration of arsenic compounds. (167 references)

6007 DOES ORAL CONTRACEPTION CAUSE CANCER?

(Ger.) Kindermann, G. (Universitaets-Frauenklinik, 8520 Erlangen, West Germany). *Geburtshilfe Frauenheilkd* 36(3): 213-219; 1976.

Known relations between hormone challenge and histological responses in the vulva, vagina, cervix, ovary, endometrium, and breast are reviewed. Particular attention is devoted to ectropion, atypical cervical hyperplasia, and dysplasia (carcinoma in situ). There is no presently demonstrable link between oral contraception and cancer, since steroid tumors (''estrogen'' or ''gestagen'' carcinoma or ''pill cancer'') do not occur in humans. Indirect correlations are not obvious; use of the pill might conceivably alter current sociological relations in such a way that epidemiological shifts favorable to oncogenesis could emerge. (55 references)

6008 A METHOD OF RECOGNISING CARCINOGENS IN THE LABORATORY.

(Eng.) Howe, J. R. (Central Veterinary Lab., Weybridge, Surrey, England). *Lab Pract* 24(7): 457-467; 1975.

The carcinogen recognition method presented includes a selected list of carcinogens commonly used in veterinary laboratories and a general classification of known carcinogens according to chemical groups. The problems of determining carcinogenicity and of extrapolating from the results of animal experiments are discussed; the determination of a carcinogenic rating for each chemical is suggested as being useful in determining the level of precautions needed for safe handling. Evidence from animal experiments on the carcinogenicity of chemicals was used to place compounds into the arbitrary categories of potent carcinogen, carcinogenic, and suspect carcinogen. In addition to animal studies, most of the evidence for human carcinogens comes from studies of occupational, medical, or environmental situations. No epidemiological studies of laboratory workers have been published, but it seems reasonable to assume that they are at risk, due to exposure to a wide variety of
chemicals. A list of 42 chemicals used in veteri
laboratories, with known or suspected carcinogen
properties in man or animals, is presented; 11 c
icals are categorized as potent carcinogens, 16
carcinogenic, and 15 as suspect carcinogens. The
list includes the chemical formula and synonyms,
summarizes and evaluates the relevant carcinogen
evidence. Other selected lists of carcinogens ar
also acknowledged. The following high risk class
of chemicals are tabulated: polycyclic hydrocarb
aromatic amines, azo compounds, nitroso compound
organic alkylating compounds, and radioactive su
stances. The list of carcinogens presented inclu
95% of carcinogens randomly selected from three
published lists of carcinogens. Furthermore, the
ratio of the derived figures for organic compoun
and organic carcinogens suggests that 1%-4% of o
ic chemicals used in the laboratory may be known
carcinogens. Further approximations on the proba
ity of carcinogenicity are presented. These appr
imations indicate that compounds falling within
classification scheme have a probability of bein
carcinogenic that is about 100-fold that of comp
outside the classification. Thus the classificat
may contribute to controlling the cancer hazard
the laboratory. (17 references)

6009 ROLE OF EXOGENOUS ESTROGENS. (Eng.) Le

ison, E. F. *In: Risk Factors in Breast*
Cancer. Stoll, B. A., ed. (Chicago: William Hein
Medical Books, Ltd.): vol. 2, pp. 67-70; 1976.

The exact effect of exogenous estrogens on the
incidence of breast cancer is not known. These h
mones can be either promoters of breast cancer
etiologic agents. Estrogens have been shown to
directly on breast tissue cells and to promote
and differentiation. They also stimulate the re
of prolactin, which affects mammary cells. Clin
evidence indicates that the breast is an estrog
sensitive target organ. Breast cancer has also
noted in men taking estrogens therapeutically.
use of diethylstilbestrol during pregnancy has
creased the incidence of vaginal cancer in fema
offspring. Several studies have explored the re
ship between birth control pills and breast can
So far no data have appeared that support a sig
cant association between the taking of exogenou
estrogens or the pill and the incidence of brea
cancer. It is recommended that the clinical dan
of breast cancer in high risk patients be consi
ered before beginning prolonged use of the pill
(13 references)

6010 DNA REPAIR AND CARCINOGENESIS. (Eng.)

Roberts, J. J. *In: Scientific Foundat*
of Oncology. Symington, T.; Carter, R. L., eds.
(Chicago: William Heinemann Medical Books, Ltd.
pp. 319-333; 1976.

The possible role that DNA repair mechanisms pl
in the etiology of neoplasia and the susceptibi
of DNA to modification by repair inhibitors is

i. Covalent binding of residues of chemical
nogens or their metabolites to DNA in vivo has
lemonstrated. Although there are numerous DNA
ion sites, the major site accounting for 90% of
ation is the N-7 guanine. No correlation, how-
has been found between alkylation at this site
morigenicity or mutagenicity. Initial studies
excision repair were based on the removal of
radiation-induced thymine dimers from DNA in
richia coli; later studies have involved mam-
cells as well. In repair synthesis, exonucle-
rmally recognizes and excises the damaged
of DNA, and polymerase resynthesizes new DNA
the opposite strand as a template. Demonstra-
f the loss of a specific chemical substituent
using radioactive compounds of high specific
ty provides evidence for a specific excision
ism. Rat liver endonuclease that acts preferen-
on depurinated DNA has been isolated; endonu-
tic activity for UV-irradiated DNA has been
in human fibroblast extracts and HeLa cells.
s suggest that methylated and ethylated DNA is
ized by an excisionlike repair process sepa-
rom that controlling the excision of pyrimi-
imers and under genetic control. DNA damage
ted by chemical agents elicits both repair
sis and unscheduled DNA synthesis. Both of
are also reduced in xeroderma pigmentosum, a
e in which the patients are defective in their
y to eliminate UV-induced DNA damage due to an
mal recession mutation. It is suggested that
y as 10^3 alkylations are necessary to produce
ngle-strand break formed at an alkali-labile
ic DNA site. Postreplication repair may cor-
amage in newly replicated DNA formed from a
ally damaged parental strand of DNA that has
one incomplete or no excision repair. Models
een proposed for this repair mechanism in both
ial and mammalian cells following UV irradia-
Evidence indicates that this process, which
inhibited experimentally by caffeine, is
ant in the recovery of cells from the poten-
lethal consequences of alkylation damage, as
s mutagenic and chromosome-damaging effects.
ing to the mutation concept of carcinogenesis,
ms that repair-deficient cells, which are more
tible to mutagenic and chromosome damage,
undergo neoplastic transformation more read-
lternatively, DNA, may facilitate the incorpora-
a virus into host DNA. (98 references)

EXPOSURE TO ASBESTOS DUST.

(Eng.) Anonymous. (No affiliation given). *Br Med J*
: 1361-1362; 1976.

ional exposure to all commercial types of
s may lead to the development of pulmonary
s and carcinoma of the lung, particularly in
te smokers. The carcinomas develop after the
have had sufficient exposure to have at
moderate pulmonary fibrosis. Diffuse meso-
a of the pleura appears to be associated with
e to crocidolite (blue) asbestos dust. The
y Committee on Asbestos Cancers to the Direc-
the International Agency for Research on
Cancer has determined that there is little if any increased risk of mesothelial cancers due to exposure to low asbestos levels for the general population. Differences in the incidence of mesothelioma between urban and rural areas were reported, the causes of which were not established. The use of blue asbestos has been severely curtailed in England since 1969. Crocidolite asbestos should be replaced with less dangerous materials in areas in which humans may be exposed. However, even in populations with a history of high exposure to crocidolite asbestos dust, the incidence of mesotheliomas is less than 7%. (6 references)

6012 THE FEATURE IN COMMON AMONG PERSONS AT HIGH RISK OF LEUKEMIA.

(Eng.) Miller, R. W. *In: Biology of Radiation Carcinogenesis.* Yuhas, J. M.; Tennant, R. W.; Regan, J. D., eds. (New York: Raven Press): pp. 45-50; 1976.

Various characteristics common among different types of leukemias are discussed. Chronic myelogenous leukemia and acute myelogenous leukemia are associated with chromosome abnormalities, especially translocations involving chromosomes 9, 8, and 21. Chronic lymphocytic leukemia is associated with cell-mediated immunodeficiency. Acute monomyelogenous leukemia is associated with peculiarities in the distribution of cell types. Patients with polycythemia vera treated with x-rays or ^{32}P have the highest risk of radiogenic leukemia. Chromosome aberrations may enhance radiation leukemogenesis. Other interactions between ionizing radiation and inborn abnormalities are discussed. (43 references)

6013 BENEFIT RISK COMPARISONS IN DIAGNOSTIC RADIOLOGY.

(Eng.) Oosterkamp, W. J. (Philips Res. Labs., Eindhoven, The Netherlands). *Medicamundi* 21(1): 2-6; 1976.

Radiation risks and the benefits resulting from diagnostic radiology are compared. The risk from x-ray or radioisotopic diagnosis has two components: genetic and somatic. The genetic risk is the possibility of radiation-induced genetic mutations or chromosome aberrations in the reproductive cells. Somatic radiation effects include acute, late, and teratogenic effects. Benefits and risks in radiodiagnostic examination can be expressed in restored health and health impaired by radiation, or as lives saved and estimated lives lost as a result of genetic or somatic radiation damage. The benefits can be best estimated by mass surveys of large groups of people. Published data on benefit-risk comparisons for mass stomach (2 million persons) and chest (40 million radiographs) surveys show a considerable benefit surplus. Studies have also indicated that this benefit exists in the case of clinical examinations of the sick. Research efforts should be concentrated on better ways to reduce the number of diagnostic errors, and risk estimates should be made as realistic as possible. (13 references)

6014 ''SOLID-STATE'' OR ''FOREIGN-BODY'' CARCINOGENESIS. (Eng.) Brand, K. G. *In: Scientific Foundations of Oncology*. Symington, T.; Carter, R. L., eds. (Chicago: William Heinemann Medical Books, Ltd.): pp. 490-495; 1976.

''Foreign-body'' (FB) tumorigenesis, in which the physical presence and physicochemical characteristics, such as size and shape, of the foreign material are primarily responsible for tumor development is reviewed. Experimental FB sarcomas show negligible tumor-specific antigens and the cells have a pronounced tendency to lose antigens, a process that seems to occur early in the preneoplastic stage. Considerable differences in susceptibility exist between species, inbred strains, and even sexes; it is suggested that the incidence and latent period of tumors might be correlated with the normal life span of the species concerned. In studies using mice and rats, attention has been focused on the nodules of atypical fibroblastic proliferation, which regularly appear in foreign body reactions 6-12 mo after implantation, because these zones are believed to be preneoplastic foci. When preneoplastic cells attached to the surface of a plastic film implant were transplanted sc from CBA/H or CBA/H-T6 mice to syngeneic recipients, homologous tumors developed up to 2 yr later. Decisive events that determine tumorigenesis, then, seem to occur before parent cells expand into a clone and survive transplantation. However, further studies indicate that complete neoplastic maturation can proceed only in progeny cells interacting directly with the surface of implants with specific properties. Evidence seems to indicate that pericytes, rather than macrophages or fibroblasts, are progenitor cells for FB-induced tumors for the following reasons: (a) They are local mesenchymal cells able to serve as precursors for various other mesenchymal cell types. (b) They are ultimately concerned in host reactions to foreign bodies. (c) They possess subcellular morphologic features compatible with FB-sarcoma cells. Although extensive use of artificial implantations occurs in humans, FB tumor incidence is rare. Viruses recently detected in FB sarcomas warrant further investigation in this area. (8 references)

6015 NATURAL MECHANISMS OF CONTROLLING LYMPHOTROPIC HERPESVIRUS INFECTION (MAREK'S DISEASE) IN THE CHICKEN. (Eng.) Witter, R. L. (United States Dept. Agricultur ARS Regional Poultry Res. Lab., East Lansing, MI 48823). *Cancer Res* 36(2): 681-687; 1976.

Four categories of natural resistance against Marek's disease in chickens were described. These were maternal antibody, age resistance, genetic resistance, and natural immunization. In nature, these forms of resistance probably act in concert, forming complex interrelationships. The mechanisms include humoral immunity (maternal antibody), cell-mediated immunity, and perhaps other mechanisms. The question of whether tumor antigens or viral membrane antigens or both have roles in inducing Marek's disease tumor immunity is discussed. (86 references)

6016 OF STRESS, VITAMIN A, AND TUMORS. (Eng.
Seifter, E. (Dept. Biochemistry, Albert
Einstein Coll. Medicine, Yeshiva Univ., Bronx, N
10461). *Science* 193(4247): 74-75; 1976.

The increase in tumor incidence in mice infected
with mammary tumor virus as a result of exposure
environmental stresses may be due to depression
cell-mediated immune reactions caused by the hyp
secretion of corticosterone. Data are presented
that support this hypothesis: mice inoculated
with a murine sarcoma virus (MuSV-M) have increa
incidences and severity of tumor development whe
exposed to physical stress. Metyrapone a drug th
inhibits corticosterone production, prevents the
typical stress reaction and increases the resist
of stressed and nonstressed mice to MuSV-M. Ster
which can compete with corticosterone, and vitam
A, which blocks some host responses to stress, a
also protective against both thymic involution a
tumor development following inoculation with MuS
Vitamin A inhibits the growth of C3HBA transplan
tumor cells. (8 references)

6017 RELATIONSHIPS BETWEEN GENITAL HERPES S
PLEX VIRUS AND CARCINOMA OF THE UTERIN
CERVIX. (Ger.) Cuendet, J. (Institut de Microbio
ogie, Universite de Lausanne, 19, Cesar-Roux, CH
1005 Lausanne, Switzerland). *Gynaekol Rundsch* 15
74-82; 1975.

This review article discusses the different loca
ization and development of herpes simplex viruse
types 1 and 2, the venereal vector in cervical c
cinoma, serological-epidemiological assays, cell
culture transformation, viral antigens in the pr
vasive and invasive states, and the relation of
2 to nucleic acid sequences in cervical tumor ce
It is concluded that a causal connection in viv
not been established, since the virus can be la
in cancer cells without being oncogenic. (36 re
ences)

6018 RECOGNITION OF VIRUS GENOMES IN CELLS
MOLECULAR HYBRIDIZATION. (Eng.) zur H
H.; Schulte-Holthausen, H.; Wolf, H. *In: Tumor*
Host Cell Interaction. Kolber, A., ed. (New Yor
Plenum Press): pp. 415-425; 1975.

Molecular hybridization studies of Epstein-Barr
virus (EBV) are reviewed. Antibodies against EB
related antigens are present in 100% of patient
with Burkitt's lymphoma (BL) and nasopharyngeal
carcinoma (NPC). To assess the role of EBV in t
permanent growth of lymphoblastoid tissue cult
lines, nucleic acid hybridization experiments
conducted with Raji cells, a nonvirus-producin
derived from BL cells. By annealing ^{3}H-labeled
DNA with DNA from Raji cells, increased hybrid
tion was observed. Raji cells also synthesized
RNA that reacted specifically with EBV-DNA. Th
viral genomes persisted in Raji cells and exer
some genetic activity. By subjecting DNA deriv

biopsy material of BL and NPC to the same test,
s shown that both tumors annealed significantly
the background of DNA obtained from various
ol tumors. Epstein-Barr virus DNA was tran-
ed in vitro into highly radioactive complemen-
RNA (cRNA). Filter hybridizations with cRNA
rmed the DNA-DNA annealing experiments. The
nce of oncornavirus nucleic acids in various
leukemias and lymphomas is discussed; the data
some substantiation of the viral nature of the
red DNA activity. The association of herpes
2 with human cervical cancer and human cytomeg-
rus with Kaposi's sarcoma has not been confirmed
lecular hybridization methods. If these viruses
nvolved in the etiology of the respective malig-
es, their interaction is different from that of
n BL and NPC. (29 references)

VIRAL DISEASES OF THE SKIN, 1975: A 25-
YEAR PERSPECTIVE. (Eng.) Blank, H. (Dept.
tology, Univ. Miami Sch. Medicine, Miami, FL
); Haines, H. *J Invest Dermatol* 67(1): 169-176;

rch in viral skin diseases is reviewed. Most
e major advances in modern virology during the
25 yr have been due principally to the develop-
of refined laboratory techniques and tools and
provided a fund of new knowledge and informa-
about the nature of viral infection and patho-
is. The herpesviruses are undergoing intensive
emical investigation to determine whether they
arcinogenic. As a result of the success of the
Health Organization's campaign against small-
it is predicted that smallpox will have been
cated by the end of 1976. Other viruses of
ologic interest being studied include the
of warts, molluscum contagiosum, cat-scratch
se, and enteroviruses. Current research in
chemotherapy may provide the basis for treat-
ese diseases. (20 references)

ANIMAL VIRUSES, RADIATION, REPAIR MECH-
ANISMS, AND CANCER. (Eng.) Cameron, K. R.
Microbiology, Coll. Medicine, Milton S. Her-
edical Center, Pennsylvania State Univ., Her-
PA 17033). *Mol Mech Repair DNA* 5B: 755-761;

fects of radiation on animal viruses in
of repair mechanisms and their possible
onship to virus transformation and carcino-
s are summarized. Ionizing radiations enhance
ansformation potentials and survival of various
s, but the mechanism of this effect is not
With certain viral strains UV irradiation
es small plaques that seem to be due to a
in the initiation of virus plaques that occurs
first cell to become infected in each plaque.
ion spectrum for the survival of infectivity
ation to plaque size gave peaks at 260 and 280
ggesting that survival is determined by adsorp-
tion of energy by both the nucleic acid and protein component of the viral particles. Various types of viral reactivation processes are discussed. Irradiation of either virus or cells may induce repair processes or stimulate DNA synthesis, properties that may be involved in transformation. There is evidence that host-cell reactivation plays a central role in transformation. (33 references)

6021 ONCOGENIC VIRUSES: PROGRESS AND PROBLEMS. (Ger.) Rudolph, M. (Zentralinstitut fuer Krebsforschung, DDR-1115 Berlin-Buch, Lindenberger Weg 70, East Germany). *Arch Geschwulstforsch* 46(2): 150-159; 1976.

A selective overview, including a brief history, of viral carcinogenesis is presented. Among the 100 RNA tumor viruses known, certain confirmed leukemogenic oncornaviruses and their A, B, and C particles were selected for discussion. Reverse transcriptase, the virogenes, the oncogene hypothesis, and mammary gland tumor and placental viruses are the subjects highlighted. DNA viruses and herpes simplex infection, Epstein-Barr virus and its relation to Burkitt's lymphoma and infectious mononucleosis, and papilloma, polyoma, and simian virus 40 viruses are also mentioned. (48 references)

6022 CERTAIN PROBLEMS OF THE MOLECULAR BIOLOGY OF VIRUSES IN ANIMALS. (Rus.) Siurin, V. N. (Moscow Acad. Veterinary Science, Moscow, USSR). *Veterinariia* (1): 40-43; 1976.

Soviet investigations of the molecular biology of viruses in animals have taken several directions. In studies of the structure and physicochemical properties of viral components, viruses were concentrated and purified by two-phase systems of water-soluble polymers and electrophoresis in a polyacrylamide gel with sodium dodecyl sulfate. The essence of antigen specificity and causes of the appearance of new viruses have been studied with type A viruses and various methods of antigen subtype testing, including ion exchange chromatography. A unique approach based on the determination of free neuraminic acid has been used to study the functional role of neuraminidase. Mathematical models have been employed to investigate the mechanisms of viral penetration of cells. Utilizing the lability of viral albumin in Newcastle disease virus, these workers have explored the synthesis and functional "maturation" of viral albumin to gain information on the immunization effect, the interaction of virus and cell at early stages of infection, and the mechanism underlying the immunological response of the host cell to viral infection. Recently, investigators have probed antigen changes in tumor cells and the immunological interaction between them and the organism with a model of induced tumor systems. The results emphasize the expediency of developing nonspecific immunological methods of diagnosis, therapy, and prophylaxis of neoplastic processes independent of their etiology. (no references)

6023 TUMOUR VIRUS PROTEINS AT THE CELL SURFACE.

(Eng.) Kurth, R. (No affiliation given). *Nature* 256(551): 613-614; 1975.

The existence of tumor virus proteins at the cell surface is reviewed. Virus envelope glycoproteins (gp85 and gp69/71) are often inserted into the membrane of oncornavirus-infected cells. A surprising finding is that p30 can also become inserted into the plasma membranes of exogenously infected cells, as can virus polypeptide (VPP) p15, p12 and p10. In these instances, VPP must be coded by activated provirus. An attempt to find a general explanation is further complicated by the recent discovery that certain normal uninfected cells also synthesize VPP which are expressed in their plasma membrane. It is conceivable that normal fibroblasts express some VPP, perhaps in a form structurally modified by the host cell. Membrane expression of endogenous VPP might follow a precise pattern with respect to tissue distribution and kinetics of appearance and disappearance. Cell surface could mediate morphogenesis and maintenance of a differentiated state. On one hand, VPP coded by endogenous or exogenous oncornaviruses can become expressed on the cell surface and could therefore be considered as tumor-specific antigens. On the other hand, certain normal tissues also seem to express endogenous membrane VPP. Experiments have been reported in which antitumor response was clearly mediated by VPP located in the transformed cell surface, and in which immunization with exogenous gp69/71 led to significant antitumor protection. There is preliminary evidence that endogenous VPP in the cell membrane may have undergone somatic cell modification. Control of VPP expression is still under investigation. Additional data on the distribution of endogenous VPP in different organs and the kinetics of their appearance and disappearance in differentiating tissues may establish further associations between the expression of a virus-related phenotype and the process of cellular differentiation. (46 references)

6024 MUTATIONS IN MOUSE MYELOMA CELLS: IMPLICATIONS FOR HUMAN MULTIPLE MYELOMA AND THE PRODUCTION OF IMMUNOGLOBULINS.

(Eng.) Weitzman, S. (Dept. Cell Biology, Albert Einstein Coll. Medicine, The Bronx, NY); Margulies, D. H.; Scharff, M. D. *Ann Intern Med* 85(1): 110-116; 1976.

The overproduction of a homologous immunoglobin (Ig) in multiple myeloma strongly suggests that this malignancy arises from the transformation of a single normal plasma cell or plasma cell precursor. Paraproteins produced by myeloma cells sometimes differ from the normal immunoglobins. No generally accepted explanation exists for these abnormalities of Ig production although several hypotheses exist. Analysis of variants of mouse myeloma cells cloned in soft agar has led to the conclusion that heavy (H) and light (L) chain-producing mouse myelomas spontaneously convert to cells that have lost the ability to synthesize one or both of the Ig polypeptide chains. Preliminary conclusions indicate that the synthesis of either Ig polypeptide chain is not genetically
dependent on the continued synthesis of the other
chain. However, in the case of H chain synthesis,
chains may be required intracellularly to maintain
the solubility of complete H chains. Loss of L cha
production and continued synthesis of normal H cha
might prove lethal to the cell due to accumulation
of insoluble H chains. This scheme, postulating th
genesis of L chain producers, nonproducers, and H
chain fragments from an initial H_2L_2 producing cl
still leaves unanswered the nature of the genetic
instability that is the underlying condition for
this phenomenon. (38 references)

6025 CELL SURFACE CHANGES IN ONCOGENESIS: A SURVEY OF IMMUNOLOGICAL UNITS ON THE TUM CELL SURFACE.

(Eng.) Mitchison, N. A. *In: Cell Sur*
faces and Malignancy. Meeting Held in Bethesda, Se
ember 11-13, 1974. John E. Fogarty International
ter for Advanced Study in Health Sciences and Nat
Insts. Health. (Bethesda, MD): pp. 215-227; 1975.

The question of whether the immunological units
that impinge on the host's immunological system a
identical with the antigens that occur on the cel
surface is considered. The evidence is drawn from
three sources: (a) physical measurements performe
on antigens released into the serum; (b) blocking
experiments on lymphocyte receptors; and (c) expe
ments on the associative recognition of alloantig
Large amounts of free HL-A antigen (10% of the to
activity in whole blood) plus tumor-specific and
tumor-associated antigens can be detected in the
serum. Antibody-release data indicate that differ
antigens are shed from the cell surface at differ
rates, e.g., immunoglobulins are shed more rapidl
than the major histocompatibility antigens. The
larger aggregates found in the serum may be more
important in induction of the immune response, an
the smaller fragments may be more important in su
pression of the response. The antigenic units in-
volved in blocking have not been characterized, a
no systemic data are available on the relative ab
ity of malignant and normal cells to release bloc
ing antigen or on the relationship between blocki
activity and tumor growth rate. Associative recog
tion, i.e., the recognition by two distinct cells
two distinct antigenic determinants on a common
fragment, is required for at least some forms of
immune response. Although no firm conclusions can
drawn yet, there are indications that the operati
immunological units are larger and more complex t
the mono- or oligomolecular antigens of the cell
surface. (39 references)

6026 RELATIONSHIP BETWEEN BIOCHEMICAL AND I LOGICAL CHANGES.

(Eng.) Defendi, V. *In:*
Cell Surfaces and Malignancy. Meeting Held in Be
esda, September 11-13, 1974. John E. Fogarty Int
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ences and Natl. Insts. Health. (Bethesda, MD): p
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Studies are reviewed on the biochemical changes

sformed cells that can be related to modifica-
of antigenicity. The antigenic changes at the
r cell surface can be classified as being asso-
ed with general tumor or tumor-associated anti-
, specific tumor antigens, and private tumor
gens. In the first group the antigens are shared
mor cells independent of the causative agent
are probably associated with membrane changes
cteristic of rapidly growing cell populations.
e antigens are the most difficult to identify.
ific tumor antigens are those characteristic of
er tumors produced by viruses or tumors of a
ite histiotype. Private antigens are distinc-
for each tumor. Most of the biochemical and
ctural studies of tumor cell membranes have been
ucted with cells transformed in vitro by RNA or
tumor viruses. Some of the new antigens found
viral products, such as the glycoproteins of the
of RNA tumor viruses. Whether these antigens
any direct role in the observed plasma membrane
ges is not clear. Other tumor-specific antigens,
as the transplantation antigen (TSTA), appear
e virus-specific, even though they are not part
he virion structure per se. TSTA is an expres-
of viral infection and not necessarily of the
gnant phenotype, since it is also found in pri-
infected cultures of permissive cells that are
programmed to become tumor cells. Virus-induced
r cells also have TSTA's that are shared with
gens present in embryos during limited stages of
r development. There are four biochemical changes
could be relevant to modification of antigen-
y: (a) changes in agglutinin receptor sites that
r cell agglutination by plant lectins; (b) an
ease of a high molecular wt sialic-fucose labeled
opeptide in solubilized cell surface fractions
r trypsin and pronase treatment with a correspond-
increase of specific sialyl transferase; (c) a
lification of glycosphingolipid components to
l or homologous ones containing fewer carbohy-
es, including sialic acid; and (d) the loss of a
p of glycoproteins or proteins of different
cular wt from the surface of transformed cells.
references)

MURINE AND RAT MAMMARY TUMORS AS MODELS
FOR THE IMMUNOLOGICAL STUDY OF BREAST
ER. (Eng.) Brennan, M. J. (Michigan Cancer Foun-
on, Meyer L. Prentis Cancer Center, Detroit, MI
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human breast cancer process was discussed in
light of a hypothesis that each neoplastic cell
is a new obligate parasitic species derived
metazoan cells. Sufficient correlations are
d to justify the hope that the viral-induced
e mammary oncogenesis and the carcinogen-induced
mammary system may be reasonable models of the
n disease for immunological studies. There is
emiological and histopathological evidence that
iple foci of noninvasive mammary epithelial
rplasia occur in the breast in which cancer is
loping; present evidence does not prove that a
rplastic benign proliferative transformation is
gatory in the genesis of cancer cells from nor-
epithelium. There is evidence that transformation may be impaired when normal cell populations are active. Carcinogenesis does not seem to require any hormonal milieu other than the normal one. Immunodeficiencies do not seem to be necessary for the growth of experimental tumors; this agrees with the fact that a regular immunological deficit has not been found in women with operable breast cancers. Subclinical neoplastic cell populations in the breast often regress spontaneously. If each neoplasm constitutes a new species of cells attempting to occupy ecological niches that are already filled and whose hope for survival is quick adaptation in the face of great competitive pressure and possible specific attack by predators (immunocytes), then regressions would not be unexpected. The hypothesis that tumor initiation may fail for biological reasons not concerned with immunology or endocrinology deserves consideration. (54 references)

6028 HISTOCOMPATIBILITY IN CANCER. (Eng.) Takasugi, M.; Krain, L.; Terasaki, P. I. *In: Cancer Genetics*. Edited by H. T. Lynch. (Springfield: Charles C. Thomas): pp. 76-86; 1976.

The discovery of and early experiments on histocompatibility antigens are reviewed, as are studies on the genetics of resistance and susceptibility to viral carcinogenesis and immunological responsiveness. Most animal models appear to possess a single major genetic histocompatibility system. Serological and biochemical studies have emphasized the homologies between the H-2 (mouse) and HL-A (human histocompatibility locus) systems. The consistent association between histocompatibility antigens and susceptibility to cancer in mouse systems suggests important biological relationships, with parallels to be sought in man. Their proposed mechanisms fall into two categories: (a) a gene-controlling responsiveness linked to histocompatibility; and (b) unresponsiveness as a result of cross-reaction with one's own antigens. The response in F_1 to polypeptide antigens and gross-virus leukemogenesis indicates that genetic control is other than tolerance to one's own antigens. The many studies of the connection between Hodgkin's disease and HL-A indicate some association of antigens in the HL-A5, W5, W8, 4c complex with Hodgkin's disease. In a large-scale study, patients with cancer of the prostate, stomach, endometrium, and ovary and with melanoma showed essentially identical HL-A frequencies as the control population. Patients with cancer of the bladder, breast, lung, colon, and rectum and patients with lymphomas and lymphosarcoma exhibited deviations from control levels for only 1 of 23 specificities at a significant level. Among patients with carcinoma of the cervix, HL-A1 was 35% and HL-A12 was 32% compared to 27% and 24% respectively, in normal subjects. HL-A9 was 15% in these patients compared to 21% for normals. In a series of 321 patients with Hodgkin's disease, W5 and W18 were elevated at the expense of HL-A7. The potential value of HL-A antigens as possible markers for cancer susceptibility or resistance genes emerges best from family studies, many of which will have to be done across generations. (31 references)

6029 THE CULTURE OF SKIN: A REVIEW OF THEORIES AND EXPERIMENTAL METHODS. (Eng.) Prunieras, M. (Laboratoire de Recherches sur les Tumeurs de la Peau Humaine, Fondation Ophtalmologique Adolphe de Rothschild, 29 rue Manin, 75019 Paris, France); Delescluse, C.; Regnier, M. *J Invest Dermatol* 67(1): 58-65; 1976.

A critical review is presented of the standard methods of skin culture. They are poorly quantifiable, and the cultured cell populations are heterogenous. A new technique based mainly on enzymatic dissociation allows specific cell types to be extracted from the skin before cultivation so that separate cultures of epidermal keratinocytes and dermal fibroblasts can be obtained from the piece of skin. These purified systems have been used to study the kinetics of epidermal cell growth and to quantify the effect of various chemically defined substances on the growth and differentiation of keratinocytes. With further refinements in technique, purified populations of melanocytes can be extracted. The coculture of pigmented melanocytes with albino keratinocytes has been proposed as a model to study pigment donation in vitro. The usual organ culture technique, including the use of large explants of skin immersed in the culture fluid, has been modified to show that adult human skin partially regenerates in vitro and that mitotic activity goes on for months in the regenerated epidermis. The use of nucleic acid hybridization techniques, combined with skin cell cultures from human tumors, opens new avenues of research on human cancer. (81 references)

6030 PHYSIOLOGY AND PATHOLOGY OF THE THYMUS IN CHILDHOOD. (Rus.) Ivanova, M. V. (Simferopol, USSR). *Pediatriia* (10): 74-79; 1975.

Physiologic and pathologic data implicate the thymus in complex functions in childhood. Diverse theories propose that the embryonal thymus and the thymus in the neonatal period are active lymphopoietic centers or that the thymus acts as a secretory organ, stimulating lymphocytopoiesis. At present, two fractions have been isolated from thymus extract, one of them stimulating lymphopoiesis and the other inhibiting it. The most important function of the thymus is its participation in immunologic reactions. The phenomenon of immunologic tolerance, connected with the thymus, is currently being investigated in adult experimental animals. The relation of the thymic endocrine function to other internal secretory organs remains unclear. Information on the connection of pathologic manifestations with the thymus is not abundant, but different forms of myasthenia have been linked with the thymus, and the effect of the gland on erythropoiesis has also been noted. In particular, hyperplasia of the thymus has been the subject of many investigations. This condition is accompanied by compression in only one-fourth of cases and can be found only accidentally during roentgenologic examination. Recent studies have documented lymphopenia and hypogammaglobulinemia in affected children; the syndrome is observed frequently in brothers and sisters. American researchers have described patients presenting with symptoms of inborn dyskeratosis, lymphopenia, and, in some, aplastic anemia, hypog maglobulinemia, and dysplasia of the thymus. The Louis-Bar syndrome is the classic example of hypo plasia and even aplasia of the thymus. Thymus tra plants are valuable in the treatment of primary immunodeficient syndromes in childhood. (no references)

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6138 THE PREDICTIVE VALUE OF TISSUE-MEDIATED MUTAGENICITY ASSAYS TO ASSESS THE CARCINOGENIC RISK OF CHEMICALS.

(Eng.) Bartsch, H.; Malaveille, C.; Montesano, R. *In: Screening Tests in Chemical Carcinogenesis. Proceedings of a workshop organized by IARC and the Commission of the European Communities and held in Brussels, Belgium, 9-12 June 1975.* Montesano, R.; Bartsch, H.; Tomatis, L.; Davis, W., eds. International Agency for Research on Cancer. (Lyon, France); IARC Scientific Publications No. 12, pp. 467-491; 1975.

The *Salmonella* microsome system was used to assess the in vitro *Salmonella* mutagenicity assay for predicting possible carcinogenic effects of chemicals, to compare the capacity of different tissues and different species to convert chemical substances into mutagens, and, in particular, to investigate the metabolic activation of nitrosamines and chlorinated olefinic hydrocarbons. The mutagenicity of a series of cyclic nitrosamines in *S. typhimurium* strain TA 1530 was similar in liquid suspension and in soft agar, but discrepancies arose when a series of dialkylnitrosamines [of the form $(CnH_2n+_1)_2$ N-NO] with different chain lengths were considered. The dialkylnitrosamines with n > 3 did not show an enzyme-mediated response in the liquid incubation system, and in the soft agar metabolically activated dimethylnitrosamine and diethylnitrosamine exhibited negligible mutagenic activity. These findings reflect false negatives from both systems, perhaps brought about by the deterioration of microsomal enzymes by lipid peroxidation in the liquid system and by the trapping of short-lived alkylating molecular species by nucleophilic components of the agar. When the mutagenicity of a series of propylated nitrosamine derivatives was studied with microsomes from hamster and rat tissues, there was not a good correlation between tissue-specific activation to mutagenic intermediates and the known susceptibility of different tissues to carcinogenesis. A better correlation was seen when the activation to mutagenic metabolites of vinyl chloride by microsomes derived from rat and mouse liver, kidney, and lung tissues was studied. The major enzymic activities were located in both liver and kidney, sites where angiosarcoma and nephroblastoma are induced in animals exposed to vinyl chloride. No tissues studied exhibited a higher enzymic capacity than the liver to bring about the production of mutagenic metabolities. Microsomes from human livers were capable of generating mutagenic metabolites from N-nitrosomorpholine and vinyl chloride. Some aspects of the metabolism of chlorinated olefinic hydrocarbons are discussed further. (56 references)

6139 BINDING OF AFLATOXINS B_1 AND G_1 TO RAT LIVER CHROMATIN.

(Eng.) Prasanna, H. R. (Dept. Biochemistry, Vallabhbhai Patel Chest Inst., Univ. Delhi, Delhi 110007, India); Gupta, S. R.; Viswanathan, L.; Venkitasubramanian, T. A. *Toxicol Appl Pharmacol* 36(3): 503-510; 1976.

Fluorescence quenching was used to measure toxin-chromatin interaction. Interaction of aflatoxin B_1 with components of chromatin increased in the following order: nonhistone residue, DNA, histone, histo
free chromatin, and intact chromatin. Fluorescence
change due to interaction of aflatoxin B_1 with var
ous complexes of chromatin constituents was not
significantly different from that obtained with DN
Association of aflatoxin B_1 with chromatin components was very weak, whereas that with reconstitut
deoxyribonucleoprotein (consisting of histone, non
histone residue, and DNA) and with native chromati
was strong, as shown by the increase in fluorescen
polarization of aflatoxin. The results suggest the
importance of the structural integrity of chromati
in the binding with aflatoxin. Interaction of afla
toxin G_1 with chromatin was less than that of afla
toxin B_1. (22 references)

6140 THE EFFECTS OF PROLONGED FEEDING WITH AFLATOXIN B_1 ON ADULT RAT LIVER.

(Eng.) Godoy, H. M. (Laboratorio Quimica Biotoxicologica
Zufriategui y Varela, Villa Martelli, Provincia d
Buenos Aires, Argentina); Judah, D. J.; Arora, H.
L.; Neal, G. E.; Jones, G. *Cancer Res* 36(7): 2399-
2407; 1976.

The effects of feeding male Fischer rats, weighin
approximately 280 g, for 6 wk with a carcinogenic
regimen of aflatoxin B_1-contaminated diet are described. A diet of peanut meal was naturally cont
inated with aflatoxin B_1, the final diet containi
4 ppm. Histological effects of liver sections wer
related to changes observed in nuclear separation
made using zonal centrifugation. Changes in nucle
RNA and DNA synthesis levels were studied in the
populations of hepatic nuclei separated in the zo
rotor. The first 3 wk of the feeding period was
accompanied by continuing inhibitions of nucleic
acid synthesis, terminating in a loss of the majo
of the tetraploid hepatocyte nuclear population.
subsequent 3 wk of feeding was predominantly a pe
of proliferation, restoration of the lobular arch
ture, and recovery of nucleic acid synthesis. The
possible bases of these two opposite effects, inh
tion followed by stimulation, which occurred sequ
tially during the continued feeding of the toxic
diet, are discussed: the toxin could transform ce
tain of the parenchymal cells into a resistant st
or a preexisting resistant population of cells co
proliferate to take the place of the susceptible
population as it necroses. (15 references)

6141 ALTERED HORMONE CONTROL OF CYCLIC AMP FORMATION IN ISOLATED PARENCHYMAL LIVER CELLS FROM RATS TREATED WITH 2-ACETYLAMINOFLUOREN

(Eng.) Christoffersen, T. (Inst. Pharmacology, Un
Oslo, Norway); Berg, T. *Biochim Biophys Acta* 381(
72-77; 1975.

Parenchymal liver cells isolated from adult male
Wistar rats fed a special diet supplemented with
2-acetylaminofluorene (0.025% by weight) for 4-6
were studied to determine the responsiveness of
adenylate cyclase to adrenergic versus glucagon
stimulation. Liver cells were dispersed by perfus
in vitro with 0.05% collagenase and purified by
filtration and centrifugation. After preincubatio
for 45 min, 3.75 x 10^6 cells were incubated with

ulators and/or inhibitors in 2 ml buffer contain-
2 mM theophylline. Cyclic AMP was determined by
otein-binding assay validated for crude extracts
liver cells. Glucagon (1.4 x 10^{-6} M) gave 20 pM
ic AMP/10^5 cells versus a basal level of 2 pM
ic AMP/10^5 cells in cells from the untreated
p, but 5 x 10^{-5} M adrenalin or isoprenalin re-
ed in levels of cyclic AMP of 2 and 3 pM, respec-
ly. Cells from the treated group showed a marked
ease in cyclic AMP levels in response to adren-
(15 pM) and isoprenalin (17 pM). Cyclic AMP
ls in cells from treated rats were 16, 14, and 3
0^5 cells after addition of 10^{-6} M adrenalin,
renalin, or phenylephrine, respectively. Cyclic
was 17 pM/10^5 cells with 1.4 x 10^{-6} M glucagon.
effects of phenylephrine and isoprenalin were
ked by D, L-propanolol but not by phentolamine,
cating that the receptor has predominantly β-
acteristics. When 1.4 x 10^{-6} M glucagon was
d with 10^{-5} M isoprenalin, no additive effect
noted. This lack of additive effect indicates
the hormones act on one cell population. While
nchymal cells from normal rat liver respond
ngly to glucagon and poorly to adrenalin, those
reated rats have become responsive to adrenergic
ts. (20 references)

NON-RANDOM NATURE OF IN VIVO INTERACTION OF ^{3}H-N-HYDROXY-2-ACETYLAMINOFLUORENE AND SUBSEQUENT REMOVAL FROM RAT LIVER CHROMATIN-DNA.

.) Ramanathan, R. (Frederick Cancer Res. Center,
Box ''B'', Frederick, MD 21701); Rajalakshmi,
Sarma, D. S. *Chem Biol Interact* 14(3-4): 375-
1976.

binding of N-hydroxy-2-acetylaminofluorene
H-2-AAF), a liver carcinogen, or its metabolites
its subsequent removal from nuclease-accessible
nuclease-inaccessible regions of chromatin DNA
studied in the rat. The N-OH-2-AAF bound prefer-
ally to the nuclease-inaccessible regions of the
and was released from that region more rapidly
g the initial 24 hr after binding. During the
48 hr, N-OH-2-AAF was released more rapidly
the nuclease-accessible regions. After these
ial time periods release of the compound or its
olites from both regions of DNA was equal. The
ies indicate that the extent of interaction of
carcinogens with the nuclease-accessible and
ase-inaccessible regions of chromatin DNA
nds on the chemical nature of the carcinogens.
eferences)

THE NATURAL HISTORY OF HEPATIC PARENCHYMAL NODULE FORMATION IN A COLONY OF C57BL MICE REFERENCE TO THE EFFECT OF DIET. (Eng.) Gellatly,

*In: Mouse Hepatic Neoplasia. Proceedings of a
hop held at the H.T.S. Management Centre, Lane
High Wycombe, Great Britain, 12-17 May 1974.*
r, W. H.; Newberne, P. M., eds. (New York:
ier Scientific Publishing Co.): pp. 77-109;

ffect of diet on the development of hepatic
chymal nodules in C57BL mice is reviewed. The
were fed two types of diet: (a) stock pelleted
diet that provided for normal growth, reproduction, and maintenance; and (b) a semisynthetic purified diet (SSP) that was composed mainly of white wheat flour (50%), casein (20%), and groundnut oil (5% or 10%) and was generally used as a vehicle for test compounds in long-term feeding studies. Several histological differences were seen in the livers of mice fed stock pelleted diet or SSP for 80 wk. In mice fed stock diet, parenchymal cell lipid was mainly centrilobular, but the SSP diet resulted in massive accumulation of intracytoplasmic parenchymal lipid in all zones of all hepatic lobules. Other changes seen more frequently in mice fed the SSP diet included centrilobular hypertrophy, multinuclear hepatocytes, nuclei with condensed chromatin, and intranuclear inclusions. Small foci of parenchymal hypertrophy were also observed. The nodules observed were divided into three types: Type 1, foci of hypertrophy and nodular hyperplasia; Type 3, malignant neoplasms (hepatocellular carcinomata); and Type 2, a mixed group presenting features that suggest a progression from Type 1 but do not include evidence of malignant transformation. There was a greater number of histological nodules in mice fed the SSP diets that were attributable to the development of foci of hypertrophy and an increase in Types 1 and 2 nodules; the number of Type 3 nodules was not influenced significantly by SSP diets. 4-Dimethylaminoazobenzene (butter yellow), 0.06% in the SSP diet, resulted in heavy mortality (51.8%) before the end of an 80-wk trial. Twenty-two of 31 deaths (16 females, 6 males) were caused by Type 3 nodules, with severe anemia and/or gross ascites. Flavor G food additive fed to mice at dietary levels of 5% and 9% in the SSP diet did not affect survival but did increase the number of animals with macroscopic parenchymal nodules (mainly Type 1). Food color F also did not affect survival, but the incidence of hepatic nodules in female mice fed the higher level of the additive (0.125%) was at least two times as high as that in untreated animals. No increase in hepatocellular carcinoma was seen in either case. (47 references)

6144 SOME CHARACTERISTICS OF A CELL LINE DERIVED FROM A FAST GROWING RAT HEPATOMA. (Eng.)

Albrecht, C. F. (Dept. Pharmacology, Univ. Stellenbosch, P. O. Box 63, Parowvallei 7503, Cape Province, South Africa); Liebenberg, N. v.d. W.; Nourse, L. D.; Seegers, J. C. *S Afr J Med Sci* 40(2): 35-42; 1975.

A cell line that developed from a fast-growing, transplantable rat hepatoma originally induced by feeding 3'-methyl-4-dimethylaminoazobenzene is reported. The cells grow readily in Eagle's minimum essential medium with Hanks base and have a doubling time of about 22 hr during logarithmic growth. They exhibit a heterogeneous response when the medium ages. Most of the cells become detached and die, but about 10%-30% remain attached and can be resuscitated to active growth when new medium is added after 3 mo. Karyotype analyses showed that most of the cells were aneuploid although 75% had 2 n (42) chromosomes. The modal number was 42, exactly diploid. Two large, abnormal chromosomes were found: a single metacentric marker in 80% of the cells and a single submetacentric in 70% of the cells. Ultrastructural analyses revealed that about 25% contained patches of densely staining particles about 50 nm in diameter. The particles, which stained positively for glycogen, were also present in cells growing in glucose-depleted media. The cells were also very active in the synthesis of lactic acid. (8 references)

6145 ENZYMATIC CONVERSION OF BENZO[A]PYRENE LEADING PREDOMINANTLY TO THE DIOL-EPOXIDE R-7,T-8-DIHYDROXY-T-9,10-OXY-7,8,9,10-TETRAHYDROBENZO[A]PYRENE THROUGH A SINGLE ENANTIOMER OR R-7,T-8-DIHYDROXY-7,8-DIHYDROBENZO[A]PYRENE.

(Eng.) Yang, S. K. (Chemistry Branch, NCI, NIH, Bethesda, MD 20014); McCourt, D. W.; Roller, P. P.; Gelboin, H. V. *Proc Natl Acad Sci USA* 73(8): 2594-2598; 1976.

Benzo[a]pyrene was metabolically and stereospecifically converted by mixed-function oxidases of rat liver microsomes and epoxide hydratase to the single enantiomer (−)r-7,t-8-dihydroxy-7,8-dihydrobenzo[a]pyrene. This was further metabolized stereoselectively by the mixed-function oxidases to predominantly the diol-epoxide, r-7,t-8-dihydroxy-t-9,10-oxy-7,8,9,10-tetrahydrobenzo[a]pyrene, in which the 7-hydroxyl and the 9,10-epoxide are trans. Other unidentified metabolites were formed from the r-7,t-8-dihydroxy-7,8-dihydrobenzo[a]pyrene. Racemic r-7,t-8-dihydroxy-7,8-dihydrobenzo[a]pyrene was converted metabolically to both r-7,t-8-dihydroxy-t-9,10-oxy-7,8,9,10-tetrahydrobenzo[a]pyrene and r-7,t-8-dihydroxy-c-9,10-oxy-7,8,9,10-tetrahydrobenzo[a]pyrene. The identification and characterization of the diol-epoxides as r-7,t-8-dihydroxy-t-9,10-oxy-7,8,9,10-tetrahydrobenzo[a]pyrene and r-7,t-8-dihydroxy-c-9,10-oxy-7,8,9,10-tetrahydrobenzo[a]pyrene were accomplished by the identity of their tetrahydroxy-tetrahydrobenzo[a]pyrenes hydrolysis products with those of the authentic synthetic compounds with respect to mobility on high-pressure liquid chromatography and mass and uv absorption spectral analysis. The diol-epoxides were also reduced in the presence of NADPH to distinct trihydroxypentahydrobenzo[a]pyrenes. Since the synthetic racemic r-7,t-8-dihydroxy-t-9,10-oxy-7,8,9,10-tetrahydrobenzo[a]pyrene is highly mutagenic in mammalian cells, it is suggested that it is the metabolically formed diol-epoxide that may be an ultimate carcinogenic form of benzo[a]pyrene. (24 references)

6146 EFFECTS OF ANTIOXIDANTS ON METABOLISM OF AROMATIC POLYCYCLIC HYDROCARBONS.

(Eng.) Wattenberg, L. W. (Dept. Lab. Medicine and Pathology, Univ. Minnesota Medical Sch., Minneapolis, MN 55455); Speier, J.; Kotake, A. *Adv Enzyme Regul* 14: 313-322; 1976.

The possibility of indirect inhibition by antioxidants of carcinogens was studied with butylated hydroxyanisole (BHA) as the antioxidant and benzo(a)-pyrene (BP) as the carcinogen. The metabolism of BP by liver microsomes in female A/HeJ mice fed a control diet or a diet containing BHA was studied. Aryl hydrocarbon hydroxylase (AHH) activity was not changed by BHA feeding. However, the measurement of other parameters demonstrated that BHA feeding a tered the microsomal system metabolizing BP. Inc tion of BP and calf thymus DNA with liver micros from BHA-fed mice showed about half the binding BP metabolites to DNA compared to that of contro The AHH activity of mice fed BHA was much more s sitive to in vitro inhibition by α-naphthoflavon than that of controls. The amount of cytochrome P-450 was increased per unit wt of microsomal protein and liver in mice fed BHA. The ethyl iso anide binding spectra were measured to see if al tions of cytochrome P-450 were produced by BHA f ing. The maximum at 430 nm was the same in contr and BHA-fed mice. However, the maximum at 455 nm lower in BHA-fed mice than in controls, which in cated that BHA had caused some change. These dat show that BHA feeding results in altered propert of liver microsomes, including a decrease in BP metabolite binding to DNA. (34 references)

6147 INTERACTION OF POLYCYCLIC AROMATIC HY CARBONS AND LIGHT WITH REGARD TO ITS CARCINOGENIC EFFECTS.

(Ger.) Bauer, L. (D-852 E langen, Wasserturmstr. 5, West Germany); Graef, *Zentralbl Bakteriol (Orig B)* 161(4): 304-316; 1

Ciliates of the species *Tetrahymena pyriformis* used as indicators to test the phototoxic effec 3,4-benzpyrene, 1-2-benzpyrene, indenopyrene, f thene, and 1,2,5,6-dibenzanthracene, soot parti and aflatoxin B_1. The lower limit of ciliate cy toxicity for 3,4-benzpyrene was 2 ppb; 1,2-benz and fluoranthene were scarcely phototoxic at 10 ppb. The combination of 3,4-benzpyrene and fluo thracene had neither an additive nor subtractiv effect; i.e, the combined effect equaled that o 3,4-benzpyrene alone. Aflatoxin phototoxicity c not be detected even at 200 ppb, confirming tha carcinogenicity is independent of fluorescent p ties. The elevated toxicity of soot particles w function of their polycyclic hydrocarbon concen tion, especially 3,4-benzpyrene. (26 references

6148 THE EFFECT OF MOUSE EMBRYO FIBROBLAST THE BINDING OF CARCINOGENIC POLYCYCLI HYDROCARBONS BY NEOPLASTIC L CELLS.

(Eng.) Buju I. M. (Lab. Mathematical Methods in Biology, Mo State Univ., Moscow, USSR); Mittelman, L. A.; P M. A. *Eur J Cancer* 11(9): 669-673; 1975.

The effect of mouse embryo fibroblasts on the b ing of carcinogenic polycyclic hydrocarbons by plastic L cells was investigated. Normal cells, 10^6 cells/flask, were seeded in 100 ml flasks a to 48 hr later, 8 x 10^6 L cells were added (mix culture). ^{3}H-benzo(a)pyrene (^{3}H-BP), 0.01 g/ml, added to the culture 24 hr after the L seeding. accumulation of strongly-bound BP metabolites 2 after the addition of ^{3}H-BP in the pure culture cells appeared to be 25 to 70 times lower than the pure culture of normal fibroblasts. The amo of firmly-bound metabolites accumulated by L ce in the mixed culture was 6 to 10 times higher t the L cells in pure culture. The differences in accumulation between the cells of pure culture mixed cultures became more apparent 1 hr after

ition of ^{3}H-BP. Proteins in the medium of the
e culture of L cells bound 5 to 20 times fewer
abolites firmly than proteins in the medium of
pure culture of normal fibroblasts. The results
onstrate that cocultivation of normal fibroblasts
neoplastic fibroblasts leads to an accumulation
^{3}H-BP metabolites in L cells. The presence of
rophobic bridges between normal and L cells in
ed culture has been postulated. Hydrocarbons such
BP metabolites could be transferred from cell to
l along these bridges. Accumulation of firmly-
nd ^{3}H-BP metabolites in the mixed culture pro-
ds more slowly than in the pure culture of normal
ls, which may indicate an influence of L cells
the normal fibroblasts. (16 references)

9 ASSOCIATION OF LIVER TUMORS WITH ORAL CONTRACEPTIVES. (Eng.) Nissen, E. D. (Liver
r Registry, Dept. Obstetrics & Gynecology, Sch.
icine, Univ. California, Irvine, 101 City Drive
h, Orange, CA 92668); Kent, D. R.; Nissen, S.
McRae, D. M. *Obstet Gynecol* 48(1): 49-55; 1976.

occurrence of benign hepatocellular neoplasia
2 women receiving oral contraceptive steroids
no other known hepatotoxins is reported. A
ew of recent literature yielded 45 cases. This
king increase in what were formerly rare primary
r tumors in young women strongly suggests a
e and effect relationship. Eighteen patients
ented with intrahepatic or extrahepatic rupture
hemoperitoneum with hemorrhagic shock due to
ular changes within their liver tumors. Five
as a direct or indirect result of preoperative
ostoperative blood loss. The predominant lesions
focal nodular hyperplasia, hepatic adenoma, and
rtoma. The multiple synonymous nomenclature used
escribe the histopathology of these tumors re-
es clarification. For diagnosis, enzyme deter-
tions are not helpful. However, radionucleide
r scans, sonography, and celiac arteriography
be of value. Clinical surveillance must be the
ary means for identification. (11 references)

) SOME PHENOLIC METABOLITES OF 2,4-DIAMINOTOLUENE IN THE RABBIT, RAT AND GUINEA-PIG.
.) Waring, R. H. (Dept. Biochemistry, Univ.
ingham, P. O. Box 363, Birmingham B15 2TT, Eng-
); Pheasant, A. E. *Xenobiotica* 6(4): 257-262;
.

ttempt was made to determine whether 2,4-diamino-
ene is metabolized to hydroxylamines or amino-
ols, which might account for toxic and carcino-
c effects. Female Wistar rats (200-250 g), female
Zealand White rabbits (3.5-4.0 kg), and female
in-Harvey guinea pigs were given 2,4-diaminotolu-
by stomach tube at a rate of 50 mg/kg. All three
ies excreted trace amounts of unchanged 2,4-di-
otoluene and small amounts of the 4-acetyl deriva-
. Rats also excreted traces of both the diacetyl
2-acetyl derivatives. Large amounts of phenolic
bolites were found; rat urine contained six
ols and three glucuronides. The metabolites were
tified as 3-hydroxy-2,4-diaminotoluene, 5-hydroxy-
diaminotoluene, 6-hydroxy-2,4-diaminotoluene, the 3-hydroxy derivative and the 5-hydroxy isomer of 2-amino-4-acetylaminotoluene, and various glucuronides. The major phenolic metabolite in all species was 5-hydroxy-2,4-diaminotoluene. No detectable amounts of hydroxylamines or aminobenzoic acids were found. Guinea pigs formed the 5-hydroxy compounds and rabbits also excreted the 3-hydroxy compounds; rats also produced the 6-hydroxy isomer. Animals receiving a previous dose of 2,4-diaminotoluene later excreted decreased amounts of glucuronides, both of diaminotoluene and other compounds; this effect was seen 6 mo after the dose was given. Thus, metabolism of diaminotoluene to aminophenols may cause kidney tissue damage. It is unclear whether aminophenols are directly toxic to either tissues or enzyme systems or whether any effect is due to the induced methemoglobinemia. The levels of methemoglobin found in the three species correspond to the total urinary aminophenol excretion. (14 references)

6151 HEPATIC ADENOMA: A POSSIBLE COMPLICATION OF ORAL CONTRACEPTIVE THERAPY. (Eng.) Hilliard, J. L. (Dept. Medicine, Baylor Coll. Medicine, 1200 Moursund, Houston, TX 77030); Graham, D. Y.; Spjut, H. J. *South Med J* 69(6): 683-687; 1976.

The case histories of three women with benign hepatic adenoma are presented, and the histologic features of these tumors are compared to those reported in the literature. Hepatic adenomas are partially or completely encapsulated and there is little fibrous component. Bile ducts are absent. This type of adenoma was considered one of the rarest of all benign hepatic tumors until seven cases were reported in 1973. The reports in the literature are reviewed, and the possible association with oral contraceptive use is discussed. Possible cellular changes seen in hepatic adenoma are detailed. Although the mechanism through which sex steroids cause tumors is not known, it has been postulated that the tumor-producing activity of testosterone and synthetic hormones is mediated by the microsomal enzymes. Stimulation of microsomal hydrolytic enzymes might alter the metabolism of the compounds so that carcinogens may be produced or important enzyme systems may be inhibited, induced, or stimulated. The clinical features of benign hepatic adenoma are reviewed. (24 references)

6152 LACK OF INFLUENCE OF ORAL CONTRACEPTIVES ON SERUM FOLATE, HEMATOLOGIC VALUES, AND UTERINE CERVICAL CYTOLOGY. (Eng.) Ross, C. E. (Depts. Medicine, Pathology, and Obstetrics-Gynecology, Case Western Reserve Univ., Univ. Hosps. Cleveland, Cleveland, OH 44106); Stone, M. K.; Reagan, J. W.; Wentz, W. B.; Kellermeyer, R. W. *Semin Hematol* 13(3): 233-238; 1976.

Serum folate (free, total, and that bound to folate-binding proteins) was correlated with a cytological examination of the uterine cervical epithelium, diet, and standard hematological values in order to ascertain the influence of oral contraceptives on these factors. A total of 172 randomly selected women, 19-35 yr old, were studied. Those women who had never taken oral contraceptives or had not taken this medication for 9 mo were placed in the control group (77), and those taking oral contraceptives in excess of 9 mo were placed in the study group (95 women). None of the women in the study or control groups had erythrocyte macrocytosis or serum folate deficiency. There was no difference in the mean hematocrit or Hb value or in the mean corpuscular volume of erythrocytes for the two groups. No significant differences between the two groups were found for mean serum folate levels (either total or free); serum folate could not be correlated with either length of time the risk group had been on oral contraceptives, the general type of contraceptive used, or income. Two women, one in the control and one in the study group, had megaloblastic cervical cytology, but normal hematological and serum folate values. There were no cases of megaloblastic anemia. When this anemia occurs secondary to folate deficiency associated with oral contraceptives, as found in other studies, it may be related to a genetic or acquired susceptibility for malabsorption of folic acid that is manifested by oral contraceptives. (15 references)

6153 DETECTION OF THE SITES OF ALKYLATION IN DNA AND POLYNUCLEOTIDES BY LASER RAMAN SPECTROSCOPY. (Eng.) Mansy, S. (Dept. Chemistry, Univ. Oregon, Eugene, OR 97403); Peticolas, W. L. *Biochemistry* 15(12): 2650-2655; 1976.

Calf thymus DNA, poly(dG)·poly(dC), and poly(dA)·(dT) were studied by laser Raman spectroscopy using two water-soluble alkylating agents: an antitumor drug, the difunctional methyl nitrogen mustard (N-methyl-bis(2-chloroethyl)amine hydrochloride), which forms interstrand cross-links, and the dimethyl nitrogen half mustard (N,N-dimethyl-2-chloroethylamine hydrochloride). With an excess of the alkylating agent, the observed Raman frequencies due to the guanine ring modes in DNA and poly(dG)·poly(dC) changed quantitatively to those of 7-methylguanosine, showing that all of the guanine bases were alkylated in the n-7 position. Furthermore, this alkylated DNA formed a stable double helical complex at neutral pH in which the alkylated guanine residues were in the keto form. There were no changes in the Raman bands of any of the other bases in alkylated DNA. The DNA double helix, completely alkylated in at the N-7 position of guanine, melted about 35 C below that of the native DNA. Upon melting, the alkylated guanine changed from the keto to the zwitterionic form. (30 references)

6154 FATE OF [^{14}C] VINYL CHLORIDE FOLLOWING INHALATION EXPOSURE IN RATS. (Eng.) Watanabe, P. G. (Toxicology Res. Lab., Health and Environmental Res., Midland, MI 48640); McGowan, G. R.; Madrid, E. O.; Gehring, P. J. *Toxicol Appl Pharmacol* 37(1): 49-59; 1976.

The fate of inhaled ^{14}C-vinyl chloride (VC) at different exposure concentrations was studied in rats. Male rats were exposed to 10 or 1,000 ppm ^{14}C-VC for 6 hr, and the routes and rates of elimination of ^{14}C activity were followed for 72 hr after termination of exposure. Following exposure to 10 ppm of VC, urinary ^{14}C activity and expired VC comprised 68% and 2%, respectively, of the recovered
radioactivity. After exposure to 1,000 ppm of VC,
the proportion of the radioactivity in the urine
decreased and that expired as VC increased, repre
senting 56% and 12%, respectively. The pattern of
pulmonary elimination of VC per se was described
similar apparent first-order kinetics following 1
or 1,000 ppm with respective half-lives of 20.4 a
22.4 min. ^{14}C activity in the urine was eliminate
in accordance with a two-exponential equation; th
half-lives for the initial phase of excretion wer
4.6 and 4.1 hr following 10 and 1,000 ppm, respec
tively. Recovered ^{14}C activity remaining in the
carcass after 72 hr was 14% and 15%. VC per se wa
not found in tissues. The urinary ^{14}C activity wa
separated by high-pressure liquid chromatography
into three major metabolites corresponding to N-acetyl-S-(2-hydroxyethyl)cysteine, thiodiglycolic
acid, and a third unidentified metabolite. The pr
portions of the urinary metabolites were not mark
influenced by the exposure magnitude. The fate of
inhaled ^{14}C-VC was dose-dependent; this is consis
with previous studies on the fate of VC following
ingestion as well as inhalation. (13 references)

6155 THE TOXICITY (IN COMPLEX ACTION) AND TH
POSSIBLE CARCINOGENICITY AND COCARCINOG
ICITY OF TRIETHANOLAMINES. (Rus.) Kostrodymova, G
M. (A. N. Sysin Inst. General and Communal Hygien
Acad. Medical Sciences USSR, Moscow, USSR); Voron
V. M.; Kostrodymov, N. N. *Gig Sanit* (3): 20-25;
1976.

In a 6-mo study to evaluate the toxicity, carcino
genicity, and cocarcinogenicity of chemical compo
used in household detergents, 70 albino rats and
CBA x $C_{57}BI_6$ male mice were exposed to triethanol
amine (TEA), 20-methylcholanthrene (20-MC), and t
syntanole (DS-10). The animals were randomized in
several groups. Modes of application and concentr
tions of tested compounds are described in detail
The results of the experiment showed that TEA in
regimen of 6.5% epicutaneously, ec, + 1.4 mg/lite
po had no toxic effect on mice, while TEA at 13%
+ 1.4 mg/liter po produced certain functional cha
in the liver and in the CNS. The ec action of TEA
revealed no carcinogenic effect. In the mice trea
with TEA and DS-10 (animals received a single ec
application of 0.5% 20-MC and on the 21st day beg
to receive twice weekly alternately 40% DS-10 sol
or 50% TEA soln), the incidence of papillomas was
significantly higher than in controls, but less t
in the group treated with DS-10 alone (percent of
animals with skin tumors was 40 and 48.5, respectively). (8 references)

6156 EXPERIMENTAL PRODUCTION OF GASTRIC CANC
IN RATS, HAMSTERS, AND DOGS. (Eng.) Kaw
chi, T. (Biochemistry Div., Natl. Cancer Center R
Inst., Tsukiji 5-1-1, Chuo-ku, Tokyo 104, Japan).
GANN Monogr Cancer Res (18): 105-109; 1976.

Administration of N-methyl-N'-nitro-N-nitrosoguanidine (MNNG) successfully induced stomach cancer
with high reproducibility and frequency in rats,
hamsters, and dogs. MNNG given at a concentration

ıg/ml to rats for 7 mo induced tumors in 90% of
animals. Two-thirds of these were differentiated
adenocarcinomas. Addition of a detergent such
Ween 60 to the MNNG solution resulted in in-
ised anaplastic tumors. Hamsters given the same
tment showed a similar pattern of tumor produc-
ı. Almost all mongrel and beagle dogs receiving
3 μg/ml of MNNG for about a year developed adeno-
inomas of the stomach. The differentiated type
loped in the cardiac and antral portions; signet-
; cell carcinomas also appeared in the antrum.
owup studies of the dogs, using radiography,
scopy, and biopsy, provided information on the
esses and time courses of development of the
ous lesions. (8 references)

HISTOCHEMICAL DEMONSTRATION OF AN ACID PHOSPHATASE STRONGLY ACTIVATED BY ZINC
ATE IN EARLY STAGES OF N-ETHYL-N-NITROSOUREA-
CED TUMORS IN RAT BRAIN.

(Ger.) Rath, F. W.
hologisches Institut, Martin-Luther-Universitaet,
402 Halle/Saale, Leninallee 14, East Germany);
cetti, D. *Neuropatol Pol* 13(3/4): 507-509; 1975.

hyl-N-nitrosourea (85 mg/kg sc) induced 20
mas in six rats; 17 were microtumors, including
igodendroglia and 8 mixed gliomas (5 of which
mainly characterized by astrocyte prolifera-
). The oligodendroglia were histochemically
tive for acid phosphatase, which was completely
bited by zinc acetate and sodium tartrate. The
ocyte-rich gliomas, especially in perivascular
lizations, were positive for a tartrate-resis-
acid phosphatase activated by zinc ions; other
d gliomas were also positive. (4 references)

REVERSIBILITY AND IRREVERSIBILITY OF LIVER TUMORS IN MICE INDUCED BY THE α ISOMER OF
3,4,5,6-HEXACHLOROCYCLOHEXANE.

(Eng.) Ito, N.
oya City Univ. Medical Sch., 1 Kawasumi, Mizuho-
Mizuho-ku, Nagoya 467, Japan); Hananouchi, M.;
hara, S.; Shirai, T.; Tsuda, H.; Fukushima, S.;
saki, H. *Cancer Res* 36(7): 2227-2234; 1976.

characteristics of mouse liver tumors induced
he α isomer of 1,2,3,4,5,6-hexachlorocyclohexane
HC), notably their reversibility or irreversi-
ty were studied. Male 8-wk-old DDY mice were
a basal diet supplemented with 500 ppm of
C for 16, 20, 24, and 36 wk and then a basal
without α-BHC for 4, 8, 12, 16, 24, or 36 wk.
arious intervals, 13 to 20 mice were killed for
t and electron microscopic observations. The
dences of liver tumors in mice induced by α-BHC
eased progressively on continuous administration,
when α-BHC was discontinued some tumors disap-
ed. Histologically, after α-BHC administration
24 wk, most tumors were nodular hyperplasias,
there were only a few well-differentiated hepato-
ılar carcinomas. However, 60 or 72 wk after the
nning of the experiment, most of the liver tumors
hepatocellular carcinomas and there were only a
nodular hyperplasias. At 60 or 72 wk the liver
ıchymal tissue in nontumorous areas was essen-
ty normal, but small foci were occasionally seen
in nontumorous areas that were composed of remaining hyperplastic nodular cells, phagocytic cells, Kupffer cells, and leukocytes. These findings suggest that the reversible tumors were usually nodular hyperplasias, whereas the irreversible tumors were hepatocellular carcinomas. After α-BHC administration was stopped, many mesenchymal cells infiltrated the nodular hyperplastic lesions and degenerated liver cells were found, indicating that mesenchymal cell elements may be important in reversing the liver tumor growth induced by α-BHC. (27 references)

6159 EXPERIMENTAL HEART TUMOURS IN RATS.

(Ger.) Schreiber, D. (Pathologisches Institut, Martin-Luther-Universitaet, DDR-402 Halle/Saale, Leninallee 14, East Germany); Gerlach, H.; Wessel, H.; Musil, A. *Arch Geschwulstforsch* 46(3): 169-175; 1976.

The effect of methylnitrosourea (MNU) and ethylnitrosourea (ENU) on the development of cardiac tumors in BD-lx rats was studied histologically and histochemically. MNU was given iv to 65 rats and ip to 56 rats at single 20-mg/kg doses up to a 200-mg/kg total dose over 4 wk. The yield of heart tumors was 42%-43% in each case, chiefly in the left ventricle. The ratio of preinvasive to invasive growth was about 3:1 and 2:1, respectively, in the iv and ip cases. Adminstration of a single 15-mg/kg sc dose of MNU in 157 neonates resulted in only nine tumors, mostly in the left heart, of which five were invasive. ENU at a single 85-mg/kg sc dose in 78 neonates produced five tumors and at 17 mg/kg sc in 167 neonates produced three tumors involving both ventricles; all were preinvasive. A single transplacental dose of 30 mg/kg ENU in 67 rats yielded no tumors, an outcome identical to 185 control animals either untreated or receiving buffer solution sc. The average latency for iv or ip MNU was 258 days, for sc ENU 204-225 days, and for sc MNU 517 days. MNU iv produced the largest number of co-occurring neoplasms, with 25 brain and 15 nerve or nerve root tumors. MNU ip was associated with 17 brain tumors and 15 forestomach papillomas or carcinomas. MNU and ENU sc were linked only to a small number of nerve or nerve root tumors. Histologically, the preinvasive mass consisted mainly of small circumscribed endocardial thickenings. Tumor nosology would include fibroma, fibrosarcoma, and dedifferentiated sarcoma. The preferential site, the left ventricular endocardium, was independent of species and portal of entry. (14 references)

6160 THE INFLUENCE OF COPPER AND COBALT IONS ON DIETHYLNITROSAMINE (DENA) CARCINOGENESIS IN WISTAR RATS.

(Ger.) Zeller, W. J. (Deutsches Krebsforschungszentrum, D-6900 Heidelberg 1, Im Neuenheimer Feld 280, West Germany). *Arch Geschwulstforsch* 45(7): 634-636; 1975.

Diethylnitrosamine (DENA) was injected sc at 5-mg/kg doses once weekly in the back skin of 12 male and 12 female Wistar rats (A). Two other groups of the same design received either 0.5 mg/kg copper sulfate (B) or 0.5 mg/kg cobalt chloride (C). The total DENA dose in each group was 215 mg/kg, and the total dose of metal salts was 21.5 mg/kg. Control groups received only the salts; the animals remained tumor-free. No local tumors occurred in groups A-C. In group A 19/24 animals were affected with 18 respiratory and 7 hepatic tumors. In B, 16/24 animals had tumors, including 15 respiratory and 9 hepatic. In C, 18/24 rats presented with 16 respiratory and 8 hepatic tumors. Eight poorly differentiated carcinomas of the nasal cavity and 10 esthesioneuroepitheliomas were identified in A, with nearly identical distributions in B and C. B featured also a retro-orbital neurofibroma and a pituitary adenoma; C included one squamous carcinoma of the nasal cavity. In addition to hepatomas, necroses, fatty degeneration, hemorrhage, and dislocation of the liver plates, cholangiomatous growths and hemangioendotheliomas occurred in A and C. The lungs and trachea were clear in each group. Copper and cobalt have no effect on DENA carcinogenesis, either promotionally or prophylactically. (17 references)

6161 THE IMPORTANCE OF PROLONGED INCUBATION FOR THE SYNTHESIS OF DIMETHYLNITROSAMINE BY ENTEROBACTERIA. (Eng.) Coloe, P. J. (Dept. Microbiology, Monash Univ. Medical Sch., Prahran 3181, Australia); Hayward, N. J. *J Med Microbiol* 9(2): 211-223; 1976.

The bacteria commonly associated with urinary-tract infection were studied to determine which ones are able to produce dimethylnitrosamine (DMN). Tests with 140 strains representing *Escherichia coli*, *Klebsiella aerogenes*, *K. ozaenae*, *Proteus mirabilis*, *P. vulgaris*, *P. rettgeri*, and *P. morganii* in a defined medium supplemented with 0.09 M dimethylamine (DMA) and 0.1 M potassium nitrate showed that at least 89% of the 136 strains able to reduce nitrates produced up to 9 mM DMN in 70 hr at 37 C. Four nitratase-negative strains produced DMN from DMA in the presence of sodium nitrate. Prolonged incubation was the most important factor in determining DMN production. Stasis and persistent infection in the urinary tract, by simulating prolonged incubation of a culture, may be of importance in determining whether DMN could be produced in vivo by bacterial action in urine. (22 references)

6162 AROMATIZATION OF SHIKIMIC ACID IN THE RAT AND THE ROLE OF GASTROINTESTINAL MICRO-ORGANISMS. (Eng.) Brewster, D. (Dept. Biochemistry, Univ. Surrey, Guildford GU2 5XH, Surrey, U.K.); Jones, R. S.; Parke, D. V. *Biochem Soc Transact* 4(3): 518-521; 1976.

A study has been made of the metabolism of the carcinogen shikimic acid in the rat and of its in vitro metabolism by microorganisms isolated from the rat cecum. Male Wistar rats excreted 95%-98% of an oral dose of ^{14}C-shikimic acid (100 mg/kg) within 24 hr, 35%-49% being found in the urine, 45%-55% in the feces, and 4%-6% as expired $^{14}CO_2$. Urine analysis revealed that 15%-21% of the original dose was excreted as urinary hippuric acid and 0.6%-1.8% as conjugated catechol. When 2 mg of ^{14}C-shikimic acid was anaerobically incubated for 48 hr at 37 C with 0.5 ml of a 10% suspension of rat cecal contents in phosphate buffer, a 95%-100% conversion to cyclo necarboxylic acid occurred. It is thus suggested that microflora are responsible for the initial reduction and dehydroxylation of shikimic acid t cyclohexanecarboxylic acid and that further meta lism to benzoic acid, hippuric acid, and other a tic products occurs within the rat tissues. (10 references)

6163 EFFECT OF BETA-OXIDIZED NITROSAMINES O SYRIAN HAMSTERS. III. 2,2'-DIHYDROXY-D PROPYLNITROSAMINE. (Eng.) Pour, P. (Univ. Nebras Medical Center, Omaha, NB); Kruger, F. W.; Altho J.; Cardesa, A.; Mohr, U. *J Natl Cancer Inst* 54(141-146; 1975.

22'-Dihydroxy-di-n-propylnitrosamine (DHPN), an assumed metabolite of di-n-propylnitrosamine (DP was injected (in olive oil) sc once a wk for lif into three groups of Syrian hamsters (20 females males, each group) at three dose levels: 500 mg/ body wt, 250 mg/kg body wt, and 125 mg/kg body w All animals were completely autopsied. All treat animals developed tumors, often simultaneously i several organs or from different cells of the sa organ. The main target organs were the respirato system, pancreas, liver, and kidneys. In the res tory system, the most affected segments were the nasal cavities and the lungs. Adenomas and adeno cinomas, mostly of ductal origin, were induced i the pancreas. Liver neoplasms were hemangioendot omas, angiosarcomas, hepatocellular adenomas, ch giomas, and cholangiocarcinomas. Kidney neoplasm were adenomas and adenocarcinomas. DHPN produced tumors in the nasal cavity and trachea that were morphologically similar to those produced by 2-h droxypropyl-n-propylnitrosamine (2-HPPN), anothe possible metabolite of DPN. The tumor latency wa however, markedly reduced and the number of DHPN induced tracheal tumors was less than the number 2-HPPN-induced tumors per animal. The incidence lung and liver neoplasms was higher at all dose levels of DHPN than of 2-HPPN. The results of th study and of previously published comparative st with DPN and its assumed metabolites indicate th their carcinogenic actions in Syrian hamsters ar different. (10 references)

6164 SARCOMA AFTER INTRAMUSCULAR IRON INJEC (Eng.) Greenberg, G. (Committee on Saf of Medicines, London EC2A 1PP). *Br Med J* 1(6024) 1508-1509; 1976.

Drug histories were obtained for 90 cases of sar coma of the buttock, of which im iron had been g in 4. In 3 of these cases the interval between t injections and a diagnosis of sarcoma was 2, 4, 13 yr. In the fourth case the time interval was several months, which is unusually short for tum induction. The following tumors were found: a fi sarcoma of the left buttock in an 18-yr-old man received no more than 5 injections of Jectofer (sorbitol and citric acid complex); a myxoid type liposarcoma in the right buttock of a 40-yr-old woman who received 7 injections of 2 ml Jectofer

domyosarcoma in the right buttock of a 35-yr-old
n given 12 injections of 5 ml iron dextran (Im-
n); and a chondrosarcoma in the buttock of a
r-old woman who received injections of iron. (3
rences)

PATHWAYS OF FORMATION OF N-NITROSOPYRROL-
IDINE IN FRIED BACON. (Eng.) Nakamura, M.
agawa Prefectural Public Health Lab., 52-2,
o-cho, Asahi-ku, Yokohama, Kanagawa-ken 241,
n); Baba, N.; Nakaoka, T.; Wada, Y.; Ishibashi,
Kawabata, T. *J Food Sci* 41(4): 874-878; 1976.

trosopyrrolidine (NO-Pyr), a powerful carcinogen
ome experimental animals, has been found in
oximately 80% of bacon samples tested after
ng. The study reported was designed (a) to sur-
the concentrations of residual nitrite, pyrrol-
e (Pyr), proline, (Pro), NO-Pyr, and N-nitroso-
ine (NO-Pro) in commercial bacon collected in
s of Tokyo and Kanagawa, Japan, with analyses
re and after frying; (b) to evaluate quantita-
ly the formation of NO-Pyr from NO-Pro, Pro, or
in ground bacon samples at elevated temperature;
(c) to determine the stability of NO-Pyr in
n at high temperatures. In the range of 100-150
th a heating time of 10 min, amounts of NO-Pyr
ed from free Pro via Pyr were almost the same as
e formed via NO-Pro. At 175 C or above, the
d of NO-Pyr via Pyr was greater than that formed
NO-Pro. In bacon, 80% to 90% of NO-Pyr disap-
ed when it was brought to 200 C within 10 min
NO-Pyr in vitro was fairly stable to heating,
only a 2% to 5% loss under the same heating
itions. (26 references)

INDUCTION OF CHROMOSOMAL ABERRATIONS BY
ANTIRHEUMATOID THERAPY. (Ger.) Vormittag,
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otyping was performed with cultured peripheral
nocytes from 21 chronic, progressive polyarthritis
ents under immunosuppressive treatment. The
s included Natulan [p-(N'-methylhydrazinomethyl)-
opropylbenzamide HCl] (N) given by infusion,
anol [1,6-bis-(β-chloroethylamino)-1,6-desoxy-D-
itol diHCl] (D) given by infusion, Endoxan [cyclo-
phamide] (E) given po, and Imurel [6-[S-(1'-
yl-4'-nitroimidazol-5'-yl)]thiopurine (I) given
Chromosome anomalies among controls ranged
een 0% and 6%, with a 3% mean. In the N group
en patients), with daily doses of 250-500 mg up
.5 g total, there were two patients with a 20%
num number of aberrations, one on day 2 and one
wk posttreatment. In 6/7 cases the karyotype
ned slowly to normal within 5 wk to 10 mo post-
ment. The outcome of D administration in seven
cases was similar, with two patients reaching
maximum several days postinfusion. The dose
00 mg every second day up to a total of 1 g.
atient receiving 150-200 mg per day of E (to a
of 19.6 g) showed maximal 16%-20% aberrations
17 wk postinjection. A maximum of 18% was
ned 24 mo after 100 mg/day of I in one patient,

while another exhibited two intervals of 10% up to 9 mo posttreatment; the other four I cases averaged around 4% up to 39 mo. The percent of aberrant metaphases after colloidal gold-198 injections in the knee joint of 10 patients was 17% on the first day, with gradual declension to 11% by day 18; however, only 4/10 showed increased anomalies. Experiments with 10-day Butazolidin infusions found structural aberrations from 12% to 18% in 3/10 patients. Evidently compounds N and E are the most toxic, D and I the least. (11 references)

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The incidence of side effects in short- or long-term management of rheumatoid arthritis (RA) with azathioprine, chlorambucil, mannitol mustard, cyclophosphamide, and procarbazine in 61 patients is reported. The incidence of malignancy in RA patients under immunosuppressive control, who are generally in the upper age groups, varies little from that of corresponding age groups in the general population. Only nine carcinomas and one lymphocytic leukemia (2 yr after treatment) were found in 1,062 RA patients under cyclophosphamide or chlorambucil management. Malignancies, especially lymphomas, and frequently those occurring in the brain, have been associated with azathioprine and prednisolone therapy of systemic lupus erythematosus (SLE) and other autoimmune diseases, such as hemolytic anemia. The difference is probably due to the substantially increased immunoreactivity of SLE compared to RA. Malignancy is a late and very low risk in RA immunosuppressive therapy. (34 references)

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See also:

* (Rev): 6001, 6002, 6003, 6004, 6005, 6006, 6007, 6008, 6009, 6010, 6011, 6031, 6032, 6033, 6034, 6035, 6036, 6037, 6038, 6039, 6040, 6041, 6042, 6043, 6044, 6045, 6046, 6047, 6048, 6049, 6051, 6052, 6053, 6054, 6055, 6056, 6057, 6058, 6059, 6060, 6061, 6062, 6064, 6065, 6066, 6067, 6068, 6070, 6102, 6106, 6111, 6112, 6115, 6120
* (Phys): 6252, 6256, 6258, 6269, 6270
* (Immun): 6373, 6388, 6393
* (Path): 6395, 6444
* (Epid-Biom): 6503, 6504, 6514, 6516, 6517, 6518, 6519, 6520, 6534

6232 EFFECT OF INACTIVE CARRIERS ON THE BEHAVIOR OF INHALED PROMETHIUM IN THE LUNGS. (Rus.)

Genzike, F. (State Agency of Atom and Radiation Protection, Berlin, East Germany); Kheltser, F.; Nitshke, Kh.-V. *Med Radiol (Mosk)* 21(4): 67-69; 1976.

The activity of inhaled promethium (Pm^{147}) in the lungs of mice was investigated in relation to the amount of inactive carrier (ferric hydroxide or silicon oxide). Microdistribution of the nuclide in the lungs was studied by autoradiography. Elimination of 2.75-μm particles of inhaled $Pm^{147}Cl_3$ varied exponentially with four biological half-lives of 0.09, 8, 19, and 74 days. Total elimination from the organism proceeded according to a four-power exponential function; the half-lives of the second, third, and fourth terms were 5, 19, and 583 days, respectively. Comparison of the lung clearance values of $Pm^{147}Cl_3$ with those for other substances containing Pm revealed significant differences. The norms recommended for Pm cannot be adopted unconditionally, since the behavior of this and other nuclides depends on various parameters. Treatment with hexametaphosphate aerosols is indicated after inhalation of $Pm^{147}Cl_3$, whereas the use of polyamino polycarboxylic acids is preferred after inhalation of luminophores. (1 reference)

6233 INFLUENCE OF SINGLE OR DOUBLE EXPOSURE TO PRELIMINARY IRRADIATION ON THE RADIORESISTANCE OF MICE.

(Ger.) Brueckner, V. (Institut fuer Biophysik der Universitaet Hamburg, 2 Hamburg 20, Martinistrasse 52, West Germany); Noster, U. *Strahlentherapie* 152(2): 175-182; 1976.

Single whole-body exposures of 50, 100, 150, 200, 300 and 400 R preceding a subsequent 750-R dose at 7-, 14-, 21-, and 28-day intervals were administered to 1,778 NMRI/Han male mice to determine radioresistence semiquantitatively. Double exposures of 50, 100, 150, 200, 300, 400 and 500 R were separated by 6 wk before administration of an 850-R dose 10 days later. Single exposures had negligible or equivocal effects on radioresistance. Double exposures with small doses (up to 200 R) tended to decrease the sensitivity, with concomitant elevations in survival rates. In general, preexposure reduced radioresistance, especially at higher doses. (21 references)

6234 RADIATION-INDUCED CHROMOSOMAL ABERRATIONS IN HUMAN LYMPHOCYTES. I. DEPENDENCE ON THE DOSE OF GAMMA-RAYS AND AN ANOMALY AT LOW DOSES.

(Eng.) Luchnik, N. V. (Inst. Medical Radiology, Acad. Medical Sciences USSR, Obninsk 249020, District Kaluga, USSR); Sevankaev, A. V. *Mutat Res* 36(3): 363-378; 1976.

Cultures of human lymphocytes from the blood of healthy adult donors were irradiated with different doses of ^{60}C γ-rays, and the irradiated cells were analyzed in metaphase 50 hr after irradiation. The effect (total yield of chromosomal aberrations or total yield of exchange type aberrations) produced by the lowest dose (5 rads) appeared to be statistically significant in a sample of 1,500 cells. In the usual dose range (25-400 rads), both parabolic and linear-quadratic equations gave a satisfactor
fit of experimental data (dicentrics, fragments,
all chromosomal aberrations). Low doses of γ-rays
however, produced more aberrations than expected,
dose-effect curves are extrapolated from higher
doses. Both relations should be considered, there
merely as empirical equations. Dicentrics showed
low doses (10-30 rads) a plateau that appeared to
statistically significant. There were some indica
tions that the total number of chromosomal aberra
tions is a more reliable criterion of cytogenetic
damage than the usually accepted yield of dicentr
and rings. (No references)

6235 END PRODUCTS OF LIPID PEROXIDATION IN HUMAN EPIDERMIS: DETECTION, ENHANCEMENT FOLLOWING UV-IRRADIATION, PATHOGENIC SIGNIFICANCE

(Ger.) Diezel, W. (Universitaets-Hautklinik (Char
DDR-104 Berlin, Schumannstr. 20/21, East Germany)
Meffert, H.; Hoehne, W. E.; Sonnichsen, N. *Dermat*
Monatsschr 161(10): 823-830; 1975.

The pathology of lipid peroxidation reactions in
human skin is analyzed. The main decomposition pr
duct of fat peroxidation is malonic dialdehyde (M
which forms covalent 1-amino-3-iminopropene compo
(Schiff bases) with amino groups. The ranges of
fluorescent excitation and the emission maxima of
these compounds are closely compatible with the
fluorescence spectrum of normal human epidermis.
follows that epidermal lipid peroxidation is grea
reinforced by UV radiation. Epidermal glucose-6-phosphate dehydrogenase activity was significantl
reduced in proportion to increasing MD concentrations, suggesting that the quaternary structure c
the enzyme (and, therefore, the configuration of
active center) was altered by covalent cross-link
between its subunits and MD. The impact of this
mechanism is discussed in relation to solar eryth
photosensitization in the porphyrias, aging of th
skin, and photostimulation in lupus erythematodes
(35 references)

6236 EFFECT OF PIGMENT ON PHOTOMEDIATED PRO TION OF THYMINE DIMERS IN CULTURED MEL CELLS.

(Eng.) London, D. A. (Dept. Dermatology,
Univ. Sch. Medicine, New Haven, CT 06510); Carte
D. M.; Condit, E. S. *J Invest Dermatol* 67(2): 26
264; 1976.

The presence of intracellular melanin in irradia
cells in culture was studied to determine if it
quantitatively alters the production of thymine
dimers in DNA. Pigmented and nonpigmented Cloudm
mouse melanoma cells were selected, with the ass
tion that the two cell lines differ in their mel
pigment content. Cells were cultivated in ^{3}H-thy
to label their DNA and were exposed to UV irradi
tion (260 nm, 500-2,000 ergs/mm^{2}). Neither line
survived these doses of irradiation. DNA was extracted immediately following irradiation and wa
subjected to acid hydrolysis. The presence of th
dimers was determined by two-dimensional paper c
tography. The percent of labeled thymine recover
as thymine dimer was a linear function of UV dos
for both lines. Dimers formation in the nonpigme

was nearly twice that in the pigmented cells.
data demonstrate the photoprotective property
tracellular melanin in shielding isolated cells
one type of photomediated injury to DNA. (14
ences)

HEPATOMA OCCURRING TWO DECADES AFTER HEPATIC IRRADIATION. (Eng.) Moore, T. A. (Dept.
rnal Medicine, Section Gastroenterology, Ochsner
cal Center, New Orleans, LA); Ferrante, W. A.;
son, T. D. *Gastroenterology* 71(1): 128-132;
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se is reported in which a woman presented with
coma 20 yr after therapeutic radiation for a
med hepatic hemangioma. At the age of 12, the
ent received 1,350 rads of orthovoltage irrad-
on to the liver by an anterior port; 7 mo later,
received 1,200 rads through a right laterial
for a total dose of 2.500 rads. The liver then
rned to normal size. Twenty years later, a right
abdominal mass was noticed, but otherwise the
ent was asymptomatic. Tests showed an enlarged
with an irregular calcified mass in the right
smaller satellite calcifications, and marked
rtion of the right hepatic lobe and part of
eft lobe; the tumor had a gross macronodular
rance. An extended right hepatectomy with
ecystectomy was performed. Evidence is cited
animal studies that suggests that radiation
ocarcinogenesis is related to radiation dose
duration, the proliferative state of the liver
, the cell cycle, nutritional status, and post-
ation survival time. In the present case, impor-
biological variables include a possible genetic
and the influence of hormones, specifically
ogen. The initial course of irradiation may
initiated genetic structural damage that was
apparent until the second course, which acted
proliferative or coproliferative inducer to
ially altered cells. (21 references)

INCREASED DNA REPAIR IN SPLEEN CELLS OF PATIENTS WITH MORBUS HODGKIN. (Eng.)
auf, H.; Dolejs, J.; Howanietz, N.; Neumann,
schl, H. *In: Molecular Base of Malignancy. New
al and Therapeutic Evidence*. Deutsch, E.;
K.; Rainer, H.; Stacher, A., eds. (Stuttgart:
Thieme Publishers): pp. 119-123; 1976.

pair was studied in irradiated spleen cells
even patients with Hodgkin's Disease (HD) and
atients with hemolytic anemia (controls).
irradiation with UV light, gamma rays, or
ns plus gamma rays, the spleen cells were
ted with ^{3}H-thymidine in phosphate buffered
to which hydroxyurea (10^{-2} M) was added to
t semiconservative DNA synthesis. DNA repair
as determined by alkaline sucrose gradient
fugation. Autoradiographs of spleen cells were
ed in three cases of HD and three controls;
me number of spleens was examined for DNA
t with an impulse cytophotometer (ICP). The
equired for reversion of the displacement of
ntation profiles caused by damage to DNA was
r in spleen preparations from HD patients than in those from hemolytic patients. DNA repair after gamma radiation was more pronounced in macroscopically transformed tissue than in normal spleen. Repair time after UV radiation was 50 min in lymphogranuloma cells and 80 and 90 min in the two controls. There was no difference in the ploidy of spleen cells from HD patients and from controls as measured by ICP. Autoradiographs of spleen cells irradiated by gamma rays or neutrons plus gamma rays showed elevated grain counts in HD patients compared with the controls; no changes were observed after UV radiation. The number of labeled cells did not increase after gamma radiation but decreased after UV radiation. (12 references)

6239 RELATION OF D.N.A. REPAIR PROCESSES TO PATHOLOGICAL AGEING OF THE NERVOUS SYSTEM IN XERODERMA PIGMENTOSUM. (Eng.) Andrews, A. D. (Dermatology Branch, Natl. Cancer Inst., Bethesda, MD 20014); Barrett, S. F.; Robbins, J. H. *Lancet* 1(7973): 1318-1320; 1976.

The accelerated nervous system aging in patients with xeroderma pigmentosum (XP) might result from an impaired capacity for repair of neuronal DNA damaged by physical and/or chemical agents. An attempt was made to correlate the severity of the clinical neurological abnormalities in XP patients with the extent of reduction in post-UV colony-forming ability (CFA) of their fibroblasts in vitro. Post-UV CFA reflects functional DNA repair capacity. All fibroblast strains had decreased post-UV CFA compared to normal strains whether or not the patients had neurological disease. Post-UV CFA curves for the neurologically impaired complementation groups A and D were distinct from that for group C, which had no XP-associated neurological abnormalities. The correlation between the severity of neurological abnormalities and level of fibroblast post-UV CFA was demonstrated. It is suggested that diminished functional repair of chemically damaged DNA (neuronal DNA or possibly DNA of neuron-supporting glial cells) may be responsible for the neurological abnormalities of XP, for carcinogenesis, and possibly even for the normal and pathological aging of various organ systems. (25 references)

6240 DNA AUTORADIOGRAPHIC STUDIES ON DNA DOUBLE STRAND BREAKS AND THEIR REJOINING (Meeting Abstract). (Eng.) Watanabe, I. (Natl. Inst. Radiological Sciences, Chiba, Japan). *J Radiat Res* 17(1): 32; 1976.

6241 DAMAGE TO TISSUES OF THE CENTRAL NERVOUS SYSTEM FROM HEAVY IONS (Meeting Abstract). (Eng.) Keng, P. (Dept. Radiation Biology, Colorado State Univ., Fort Collins, CO 80523); Powers, G. E.; Lett, J. T. *Radiat Res* 67(3): 604-605; 1976.

6242 NON-HOMOGENOUS DISTRIBUTION OF PLUTONIUM IN MOUSE TESTES (Meeting Abstract). (Eng.) Russell, J. J. (Div. Biological and Medical Res., Argonne Natl. Lab., Argonne, IL 60439); Lindenbaum, A.; Grahn, D. *Radiat Res* 67(3): 624; 1976.

6243 EFFECTS OF ACUTE EXPOSURE TO ^{85}Kr IN BETA-INFINITE CLOUD GEOMETRY: RESULTS OF MEDIAN-LETHALITY STUDIES IN GUINEA PIGS, RATS, AND CHINESE HAMSTERS (Meeting Abstract). (Eng.) Rehnberg, B. F. (Health Effects Res. Lab., Environmental Res. Center, U.S. Environmental Protection Agency, Res. Triangle Park, NC 27711); Kirk, W. P.; Ostby, J. S.; Wright, J. F. *Radiat Res* 67(3): 627; 1976.

6244 THE CHEMICAL AND RADIOLOGICAL TOXICITY OF PLUTONIUM TO DEVELOPING EMBRYOS OF FISH (Meeting Abstract). (Eng.) Till, J. E. (Environmental Sciences Div., Oak Ridge Natl. Lab., Oak Ridge, TN 37830); Blaylock, B. G. *Radiat Res* 67(3): 626-627; 1976.

6245 APPEARANCE TIMES OF HUMAN BONE TUMORS INDUCED BY SKELETAL DEPOSITS OF RADIUM (Meeting Abstract). (Eng.) Keane, A. T. (Center Human Radiobiology, Argonne Natl. Lab., Argonne, IL 60439); Stehney, A. F.; Rowland, R. E. *Radiat Res* 67(3): 625-626; 1976.

6246 NEUTRON THERAPY IN THE G.D.R. VII. RADIOPHYSICAL FUNDAMENTALS OF NEUTRON THERAPY. (Ger.) Regel, K. (Zentralinstitut fuer Molekularbiologie der AdW der DDR, Aussenstelle im ZfK Rossendorf, DDR-8051 Dresden, Postfach 19, East Germany). *Arch Geschwulstforsch* 46(4): 276-280; 1976.

6247 DNA REPAIR MECHANISMS IN MAMMALIAN CELLS. XII. REPLICATIVE REPAIR IN HUMAN CELLS AND ITS ABNORMALITY IN VARIANT XERODERMA PIGMENTOSUM (Meeting Abstract). (Eng.) Fujiwara, Y. (Kobe Univ., Kobe, Japan); Tatsumi, M.; Ichihashi, M.; Higashikawa, T.; Takebe, H.; Tanaka, K. *J Radiat Res* 17(1): 30; 1976.

6248 EFFECTS OF GAMMA RAYS ON CHROMATIN SUBUNITS (NUCLEOSOMES AND MULTIMER NUCLEOSOMES) (Meeting Abstract). (Eng.) Trumbore, C. N. (Dept. Chemistry, Univ. Delaware, Newark, DE 19711); Hyde, C.: Koch, J.; Schmoyer, H. *Radiat Res* 67(3): 636; 1976.

6249 ISOLATION AND CHARACTERIZATION OF TEMPERATURE-SENSITIVE MUTANTS OF CHINESE HAMSTER OVARY CELLS AFTER TREATMENT WITH UV AND X-IRRADIATION. (Eng.) Patterson, D. (Eleanor Roosevelt Inst. for Cancer Res., Dept. Biophysics and Genetics, Univ. Colorado Medical Center, Denver CO 80220); Waldren, C.; Walker, C. *Somatic Cell Genet* 2(2): 113-123; 1976.

6250 THE INDUCTION OF LUNG TUMORS IN FEMAL
MICE AFTER NEUTRON IRRADIATION (Meeti
Abstract). (Eng.) Ullrich, R. L. (Biology Div.,
Ridge Natl. Lab., Oak Ridge, TN 37830); Jerniga
C.; Storer, J. B. *Radiat Res* 67(3): 628-629; 19

6251 EFFECT OF X-IRRADIATION ON THE PRIMIN
ACTIVITY OF DNA. (II). (Meeting Abstr
(Eng.) Nakamura, H. (Aichi Cancer Center Res. I
Nagoya, Japan); Morita, T.; Yoshida, S. *J Radia*
17(1): 8; 1976.

6252 INHIBITION OF REJOINING OF RADIATION-
INDUCED CHROMOSOME BREAKS. I. EFFECT
BENZENE IN CULTURED HUMAN LEUKOCYTES (Meeting A
stract). (Eng.) Morimoto, K. (Tokyo Univ., Toky
Japan); Koizumi, A.; Tachibana, S.; Dobashi, Y.
Katsunuma, H. *J Radiat Res* 17(1): 28; 1976.

6253 THE SIGNIFICANCE OF DIMERS TO THE SIZ
NEWLY-SYNTHESIZED DNA IN UV-IRRADIATE
CELLS (Meeting Abstract). (Eng.) Clarkson, J. M
(Dept. Physics, M. D. Anderson Hosp. and Tumor
Houston, TX 77030). *Radiat Res* 67(3): 619-620;

6254 SEROLOGIC ASSAYS OF PYRIMIDINE DIMER
TION AND REPAIR (Meeting Abstract). (
McConlogue, L. C. (Dept. Radiological Sciences,
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Lewis, H. L.; Ward, J. F. *Radiat Res* 67(3): 619
1976.

6255 THE RELATIONSHIP BETWEEN REPAIR OF P
TIALLY LETHAL DAMAGE AND RADIATION I
GIANT CELL FORMATION IN 3T3 CELLS (Meeting Abs
(Eng.) Hetzel, F. W. (Radiology Res. Lab., Mas
setts General Hosp., Boston, MA 02114); Kolodn
M. *Radiat Res* 67(3): 600; 1976.

6256 ANOMALOUS SURVIVAL KINETICS INDUCED
CAFFEINE TREATMENT IN ULTRAVIOLET-IR
ATED V79-79 CHINESE HAMSTER CELLS (Meeting Abs
(Eng.) Schroy, C. B. (Pennsylvania State Univ.,
University Park, PA 16802); Todd, P. *Radiat Re*
67(3): 620; 1976.

6257 IN VIVO ASSAY OF THE RADIATION RESPO
MAMMARY GLAND CELLS (Meeting Abstrac
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Human Oncology, Univ. Wisconsin Medical Sch.,
ison, WI 53706); Clifton, K. H. *Radiat Res* 67(
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al Center, East Meadow, NY 11554); Archambeau,
; Bennett, G. *Radiat Res* 67(3): 601; 1976.

CHEMICAL IDENTITY OF RADIATION INDUCED
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ine and Radiation Biology, Sch. Medicine, UCLA,
ngeles, CA 90024); Kuo, I.; Kay, E. *Radiat Res*
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UV PROTECTION EFFECT OF KERACYANINE, AN
ANTOCYANINE DERIVATIVE, ON CULTURED L-CELLS
ing Abstract). (Eng.) Kano, E. (Kyoto Coll.
acy, Kyoto, Japan); Miyakoshi, J. *J Radiat Res*
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COMPARATIVE BIOLOGICAL PROPERTIES OF ULTRA-
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ct). (Eng.) Elkind, M. M. (Div. Biological and
l Res., Argonne Natl. Lab., Argonne, IL 60439);
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REMOVAL OF UV DAMAGE FROM SIMIAN VIRUS 40
(SV40) DNA (Meeting Abstract). (Eng.)
ms, J. (Lab. Radiobiology, Univ. California,
ancisco, CA 94143); Cleaver, J. E. *Radiat Res*
619; 1976.

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DERIVED CELL LINE FOLLOWING ACUTE AND
ONATED DOSES OF X-IRRADIATION IN VITRO (Meeting
ct). (Eng.) Terzaghi, M. (Biology Div., Oak
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MODIFICATION OF PHOTOCARCINOGENESIS BY TWO
IMMUNOSUPPRESSIVE AGENTS. (Eng.) Nathan-
B. (120 Lawler Road, West Hartford, CT 06117);
P. D.; Urbach, F. *Cancer Lett* 1(5): 243-247;

THE ROLE OF TOTAL DOSE, TREATMENT SCHEDULE,
AND RECOVERY PERIOD ON X-IRRADIATION CAR-
IESIS (Meeting Abstract). (Eng.) Vesselinovitch,
Dept. Radiology, Univ. Chicago, Chicago, IL
Simmons, E.; Mihailovich, N. *Radiat Res*
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6267 RAPID SPLIT-DOSE RECOVERY IN IRRADIATED PLATEAU PHASE CELLS (Meeting Abstract). (Eng.) Little, J. B. (Harvard Sch. Public Health, Boston, MA 02115); Williams, J. R. *Radiat Res* 67(3): 598; 1976.

6268 FORMATION OF RADIATION INDUCED CROSSLINKS IN CHROMATIN EXTRACTED FROM CHINESE HAMSTER CELLS (Meeting Abstract). (Eng.) Mee, L. K. (Dept. Radiology, Harvard Medical Sch., Boston, MA 02115); Adelstein, S. J. *Radiat Res* 67(3): 635; 1976.

6269 MOLECULAR ASPECTS OF CARCINOGENESIS. (Eng.) Popp, F. A. *In: Molecular Base of Malignancy: New Clinical and Therapeutic Evidence.* Deutsch, E.; Moser, K.; Rainer, H.; Stacher, A., eds. (Stuttgart: Georg Thieme Publishers): pp. 47-55; 1976.

6270 DNA DAMAGE BY HYDROXYL FREE RADICALS: IMPLICATIONS FOR THE SUBUNIT HYPOTHESIS (Meeting Abstract). (Eng.) Wheeler, K. T. (Brain Tumor Res. Center, Dept. Neurological Surgery, Univ. California, San Francisco, CA 94143). *Radiat Res* 67(3): 636; 1976.

6271 TRANSFORMATION OF EMBRYO CELLS X-IRRADIATED IN UTERO AND ASSAYED IN VITRO: QUALITATIVE AND QUANTITATIVE ASPECTS (Meeting Abstract). (Eng.) Borek, C. (Columbia Univ., New York, NY 10032); Pain, C.; Mason, H. *Radiat Res* 67(3): 628; 1976.

6272 INDUCTION OF NON-REJOINING DNA BREAKS IN MAMMALIAN CELLS BY HIGH-LET RADIATIONS: THE RELATIONSHIP TO CELLULAR INACTIVATION (Meeting Abstract). (Eng.) Ritter, M. A. (Harvard Sch. Public Health, Boston, MA 02115); Cleaver, J. E. *Radiat Res* 67(3): 604; 1976.

6273 MORTALITY PATTERNS AMONG FIBROUS GLASS PRODUCTION WORKERS. (Eng.) Bayliss, D. L. (Natl. Inst. for Occupational Safety and Health, Center for Disease Control, Public Health Service, Dept. Health, Education, and Welfare, Cincinnati, OH 45202); Dement, J. M.; Wagoner, J. K.; Blejer, H. P. *Ann NY Acad Sci* 271: 324-335; 1976.

6274 POSTIRRADIATION MALIGNANT SALIVARY GLAND TUMOR. (Eng.) Rice, D. H. (Dept. Otorhinolaryngology, Univ. Michigan Medical Center, 1335 E. Catherine St., Ann Arbor, MI 48109); Batsakis, J. G.; McClatchey, K. D. *Arch Otolaryngol* 102(11): 699-701; 1976.

6275 RADIOBIOLOGICAL ANALYSIS ON THE TUMOR CONTROL PROBABILITY AND RECURRENCES (Meeting Abstract). (Eng.) Urano, M. (Natl. Inst. Radiological Sciences, Chiba, Japan). *J Radiat Res* 17(1): 3; 1976.

6276 THYROID CARCINOMA: ASSESSING RISKS OF N IRRADIATION. (Eng.) Anonymous. (No affi ation given). *Patient Care* 10(18): 86-87; 1976.

See also:

* (Rev): 6002, 6010, 6011, 6012, 6013, 601
6020, 6043, 6050, 6061, 6069, 607
6071, 6072, 6073, 6074, 6075, 607
6077, 6118
* (Chem): 6147, 6185
* (Viral): 6332
* (Immun): 6379
* (Path): 6396, 6466
* (Epid-Biom): 6521

SEPARATION OF TIME-DEFINED AVIAN MYELOBLASTOSIS VIRUS (AMV) USING COLUMN CULTIVATION UKAEMIC MYELOBLASTS. (Eng.) Buzek, J. (Inst. ic Chemistry and Biochemistry, Czechoslovak Sciences, Praha 6, Czechoslovakia). *Folia Biol* z] 22(2): 97-100; 1976.

technique for producing time-defined virus is ibed. Growth of cells in a submerged culture ccomplished in a Sial glass tube, 20 mm in ter, with its top closed by a stopper with two ngs; its bottom is formed by a constricted preceded by an S_3 sintered glass filter. The s connected with a cultivation medium reservoir; ottom connections allow for recirculation of edium after it passes through the column, or e collection of samples. Cells were immobilized Sial glass cullet 50-200 μm in size. A 9-ml cell nsion was used that contained up to 340 x 10^6/ml rged culture cells. Virus-producing cells re- virions into the medium, thus allowing the s to pass through the column. The flow rate adjusted to provide virus at time-defined vals of 0-3.5 min, 0-7 min, 0-15 min, and 0-2 age. The morphology of the column-grown cells t differ appreciably from that of cells grown ubmerged culture. This technique permits young to be separated in a relatively small volume and in a quantity sufficient for morphological ochemical analysis. (8 references)

SOME RECENT FINDINGS ON IMMUNITY TO ROUS VIRUS-INDUCED SARCOMAS IN JAPANESE QUAILS. Hayami, M. (Depts. Pathology and Microbiology, Washington Medical Sch., Seattle, WA 98195); rom, K. E.; Hellstrom, I. *Adv Biosci* 12: 471- 974.

ediated immune reactions to sarcomas induced anese quails by the Schmidt-Ruppin variant of us sarcoma virus (SR-RSV) were investigated. A rd dose of RSV (100 focus-forming units) in- tumors, some of which grew progressively, but egressed. Cell-mediated immunity could be trated with lymphoid cells from quails with sed tumors. Autochthonous and allogeneic sys- howed immunity, indicating that it is not due to histocompatibility differences between the of specifically immune and control lympho- No cell-mediated immunity was detected with cells from quails with growing tumors. Spleen from progressors and progressor serum decreased totoxic effect of regressor spleen cells, ting that the progressor cells released some s blocking cell-mediated cytotoxicity. The ng effect could be removed by absorption with arcoma cells. This was also true for the block- tected by letting the serum remain with both and target cells during the entire incubation and is consistent with the concept that the s responsible for blocking are antigen-antibody xes. The blocking effect of some regression ould also be removed by absorption with Rous a cells. A blocking activity of sera from tomized progressors was only detected when the could interact with the effector cells; this ty could not be removed by absorption with Rous sarcoma cells. It is suggested that the blocking effect of sera from bursectomized progressors is mediated by free antigen. (8 references)

6279 CELL SURFACE AND METABOLIC LABELLING OF THE PROTEINS OF NORMAL AND TRANSFORMED CHICKEN CELLS. (Eng.) Critchley, D. R. (Dept. Biochemistry, Univ. Leicester, Leicester, U.K.); Wyke, J. A.; Hynes, R. O. *Biochim Biophys Acta* 436(2): 335-352; 1976.

The surface proteins of normal cells and chicken embryo fibroblasts transformed by Rous sarcoma virus were studied by four labeling techniques with different specificities: (a) lactoperoxidase catalyzed iodination, (b) galactose oxidase/B^3H_4, (c) pyridoxal phosphate/B^3H_4, and (d) periodate/B^3H_4. All methods labeled a large external transformation-sensitive (LETS) protein, in agreement with previous studies. The use of galactose oxidase and periodate labeling techniques produced evidence that suggested that the transformed cell surface glycoproteins were more sialylated. The LETS protein was also labeled with $[^{14}C]$glucosamine, and after trypsinization, a small band of identical molecular wt to LETS remained, possibly representing an internal pool of the protein. In contrast, LETS protein labeled with $[^3H]$-fucose was completely removed by trypsin, suggesting that the internal pool of the protein was incompletely glycosylated. Evidence was also presented to show that although the protein level was drastically reduced at the transformed cell surface, it was still synthesized and shed into the medium. (33 references)

6280 CYTOMEGALOVIRUS PROTEINS. I. POLYPEPTIDES OF VIRIONS AND DENSE BODIES. (Eng.) Fiala, M. (Dept. Medicine, Martin Luther King, Jr., General Hosp., Los Angeles, Ca 90059); Honess, R. W.; Heiner, D. C; Heine, J. W.; Murnane, J.; Wallace, R.; Guze, L. B. *J Virol* 19(1): 243-254; 1976.

Cytomegalovirus (CMV) virions and dense bodies were purified by sucrose velocity and equilibrium centrifugation from the medium of fetal tonsil fibroblasts infected with CMV strain AD169. The final virus preparations were purified more than 228-fold with respect to cellular proteins, determined by double-isotopic labeling, and at least 1,600-fold on the basis of changes in the ratio of total protein to virus particles. The protein content of purified particles approximated that found for purified preparations of other herpesviruses. Twenty polypeptides ranging from 22,000 > 230,000 molecular wt were detected in purified virus preparations by sodium dodecyl sulfate-polyacrylamide gel electrophoresis. Polypeptides of virions and dense bodies were allocated on the basis of analyses of preparations containing differing percentages of virions and dense bodies. Six polypeptides were represented predominantly or exclusively in virions, and four predominantly or exclusively in dense bodies, whereas the remainder appeared to be shared by both types of particles. Four polypeptides were glycosylated, and at least three appeared to be shared by both particle types. The protein composition of cytomegalovirus differs profoundly from that of herpes simplex virus. (27 references)

6281 ALTERATIONS IN LIPID ACYL GROUP COMPOSITION AND MEMBRANE STRUCTURE IN CELLS TRANSFORMED BY ROUS SARCOMA VIRUS. (Eng.) Yau, T. M. (Dept. Radiology, Case Western Reserve Univ., Cleveland, OH 44106); Buckman, T.; Hale, A. H.; Weber, M. J. *Biochemistry* 15(15): 3212-3219; 1976.

The acyl group composition of the phospholipids from normal chick embryo fibroblasts and from cells transformed by Rous sarcoma virus was determined by gas-liquid chromatography. Rous-transformed cells had less arachidonate (20:4) and more oleate (18:1) in membrane lipids than normal, growing cells. Normal density-inhibited cells had the lowest ratio, 18:1/20:4. Associated with the decreased content of 20:4 in the transformed cells was a decreased motional freedom of an incorporated spin-labeled fatty acid analog. Arrhenius plots for the uptake of 2-deoxyglucose revealed an increased apparent activation energy in the transformed cells, suggesting that the hexose transport carriers were sensitive to the changes in membrane composition and structure in fully transformed cells. The development of changes in fatty acid composition occurred relatively slowly during transformation, indicating that the compositional alterations are not likely to be a primary cause of the early changes in membrane function associated with transformation. (48 references)

6282 LYSIS OF ONCORNAVIRUSES BY HUMAN SERUM. (Eng.) Jensen, F. C. (Depts. Immunopathology and Molecular Immunology, Scripps Clinic Res. Foundation, 476 Prospect St., La Jolla, CA 92037); Welsh, R. M.; Cooper, N. R.; Oldstone, M. B. *Bibl Haematol (Basel)* (43): 438-440; 1976.

Evidence is presented for a possible human defense mechanism that inhibits oncornavirus infection and replication. Fresh human serum inactivated Moloney leukemia virus, AKR, Friend leukemia virus, Rauscher leukemia virus, murine leukemia virus (MLV), murine sarcoma virus, simian sarcoma virus, murine sarcoma virus (Gibbon ape leukemia) pseudotype, and avian sarcoma virus B-77. Heated human serum had no effect. Purified ^{3}H-uridine-labeled MLV was not affected by heated human serum, fetal bovine serum, or guinea pig serum, but fresh human serum had a strong lytic effect. Fresh but not heated human sera released RNA-dependent DNA polymerase (RDDP) from six different oncornaviruses. Since RDDP is located within the virion, its activity is a measure of viral lysis. Human sera genetically deficient in C2 or C8 or immunochemically depleted of C4 failed to release RDDP, suggesting that complement is required for viral lysis. Component titrations after incubation of 1 x 10^{12} MLV particles/ml serum showed consumption of C1 (21%), C4 (79%), C2 (92%), C3 (51%), C5 (46%), C8 (51%), and C9 (18%). There was no evidence of antibody involvement in this reaction. This natural defense mechanism would limit horizontal transmission. It may, however, have an adverse effect against vertically transmitted type C virus and select for defective viral genes, so that only certain gene products would be expressed in the absen
of complete infectious virus in human tumors. (7
references)

6283 PROPERTIES OF THE MULTICAPSID VIRIONS OF
MURINE CYTOMEGALOVIRUS. (Eng.) Hudson, J
B. (Dept. Microbiology, Univ. British Columbia,
Vancouver V6T 1W5, British Columbia, Canada); Misr
V.; Mosmann, T. R. *Virology* 72(1): 224-234; 1976.

Murine cytomegalovirus (MuCMV) was examined by
electron microscopy of negatively stained prepara-
tions. The prevalent form of the virion was a col
tion of capsids with a typical herpeslike structu
embedded in a dense staining matrix and surrounde
by a single envelope. There were 1-20 or more cap-
sids per virion. These structures were designated
multiple- or single-capsid virions. The multiple-
capsid virions occurred at all times after infect
and were obtained from fibroblasts derived from
three different strains of mouse and 3T3 cells.
Plaque-purified strains of MuCMV also gave rise t
multiple- as well as single-capsid virions. All s
classes of MuCMV resolved by sedimentation veloci
were infectious and all displayed the phenomenon
centrifugal enhancement of infectivity. No multip
capsid virions were seen in herpes simplex or hum
CMV preparations. (11 references)

6284 STUDY OF CELLULAR RNA IN VIRAL LEUKEMOG
ESIS. (Ukr.) Smirnova, I. A. (Inst. Pro
lems Oncology, Acad. Sciences Ukrainian SSR, USSR
Dopov Akad Nauk Urk RSR Ser B (3): 280-282; 1976.

Cytoplasmic RNA, polyribosomal RNA, and messenger
RNA (mRNA) from the spleen cells of control Balb/
mice and those infected with Rauscher leukemia vi
were studied by polyacrylamide gel electrophoresi
and found to be similar. The DNA-like RNA from sp
nuclei of infected mice consisted of three basic
components, two of which corresponded to the norm
fractions. The third component (28S-30S, 1.1 x 10
daltons), which comprised 22% of all nuclear DNA-
RNA, was characterized by a poly-A sequence; this
fraction was not present in normal cells and may
ted mice also consisted of two additional compone
compared with normal DNA-like RNA. The failure t
detect changes in cytoplasmic RNA may have been
to the low concentration of virus-specific RNA i
the cytoplasm or to the inability of electrophor
to differentiate very small viral and cellular R
(10 references)

6285 TYPE C RNA VIRUSES AND LEUKEMOGENESIS:
ASSOCIATION OF GROSS STRAIN OF MURINE
LEUKEMIA VIRUS INFECTION AND LEUKEMOGENESIS IN R
(Eng.) Kawamura, Y. [Res. Inst. Nuclear Medicine
Biology, Hiroshima Univ., Kasumi 1-2-3, Hiroshim
Japan (734)]. *J Natl Cancer Inst* 56(5): 927-930;
1976.

The passage-A virus of Gross shows potent leukem
genicity in various strains of mice with a low i
dence of leukemia. In order to study the tissue
distribution pattern of rat-adapted Gross virus

in relation to the leukemogenic process, the
ation of murine leukemia virus (MuLV) infec-
nd leukemogenesis was examined by XC plaque
in W/F rats neonatally infected with RAGV.
lymphomas developed in 100% of infected rats,
mean latent period of 64 days. The virus
ivity was detected in the thymus as early as
s; the titer steadily increased thereafter
the development of thymic lymphoma. No other
s of virus-infected rats showed virus infec-
until the development of localized thymic
na, though sera of a few rats showed low infec-
titers. In rats with generalized leukemia,
, high titers were detected in the sera and
c tissues. In untreated controls, all tissues
invariably showed negative titers for MuLV
ivity at any age up to 7 mo. The results indi-
hat those tissue sites were common to both
fectivity and the leukemogenic process, with
mary involvement of the thymus, and that the
nce of RAGV infectivity in various tissues
nted the expression of the oncogenic genome
. The findings are in agreement with similar
studies with radiation leukemia virus in
a mice, but are distinctly different from
tions made of MLV infectivity and leukemogen-
AKR mice. (15 references)

CYTOMEGALOVIRUS INFECTIVITY: ANALYSIS OF
THE PHENOMENON OF CENTRIFUGAL ENHANCEMENT
CTIVITY. (Eng.) Hudson, J. B. (Dept. Micro-
, Univ. British Columbia, Vancouver V6T 1W5,
Columbia, Canada); Misra, V.; Mosmann, T. R.
y 72(1): 235-243; 1976.

ugal enhancement of infectivity was examined
detail for the murine cytomegalovirus (MuCMV).
ugal enhancement was observed in mouse em-
ltures from three different strains of mice
Balb/c, and ICR), in 3T3 cells, and in rat
cells. Three different strains of MuCMV and
ue-purified strains of MCV all showed the
y, as did the one strain of human CMV examin-
contrast, herpes simplex virus types 1 and 2
. Centrifugal enhancement could not be ex-
by increased penetration of MuCMV or its DNA
lls and their nuclei. PFU-dose response,
tivation kinetics, electron microscopy, and a
of labeling regimes with thymidine and uri-
otopes ruled out the presence of interfering
ganisms. It is concluded that centrifugal
ment is an inherent property of MuCMV parti-
nd it is suggested that some CMVs may have a
y to enter into a nonreplicating state in
ous fibroblasts. (6 references)

RELATIONSHIP OF FRIEND MURINE LEUKEMIA
VIRUS PRODUCTION TO GROWTH AND HEMOGLOBIN
IS IN CULTURED ERYTHROLEUKEMIA CELLS. (Eng.)
, C. C. (Dept. Biochemistry, Sch. Medicine,
regon Health Sciences Center, Portland, OR
Evans, L. H.; Polonoff, E.; Kabat, D. *J*
9(1): 118-125; 1976.

tors controlling oncornavirus formation were
d in Friend leukemia cells that undergo hematopoiesis when treated with dimethyl sulfoxide. Suspension cultures of the Ostertag FSD-1 cell line entered a G_0 or resting state at the end of their proliferative phase and simultaneously ceased producing helper and dependent components of Friend virus. Although the decline in virus production was at least a hundredfold, rates of cellular RNA and protein synthesis were only slightly lower in resting than in growing cells. Both resting and growing cells contained similarly large concentrations of the viral proteins P(30) and P(12). Dimethyl sulfoxide induced hemoglobin synthesis in growing cells, but its effects on virus production were apparently the indirect results of its action to inhibit cell growth and thus to delay entry of cells into G_0. Furthermore, variant cell lines were obtained with differing abilities to synthesize virus or hemoglobin. All harbored murine leukemia virus genes that were expressed to varying extents. The major internal protein of these oncornaviruses, P(39), was synthesized in large amounts by all of the cell lines. These results suggest that Friend virus production is not coinduced with erythroid differentiation, as had been proposed, but rather is controlled by a cellular growth cycle. (43 references)

6288 CO-OCCURRENCE OF RNA- AND DNA-TUMOR VIRUSES WITHIN A CELL LINE FROM MOUSE SPLEEN AND THYMUS.

(Ger.) Widmaier, R. (Zentralinstitut fuer Krebsforschung, 1115 Berlin-Buch, Lindenberger Weg 70, East Germany); Rudolph, M.; Fey, F. *Arch Geschwulstforsch* 45(5): 504-509; 1975.

Cultures of kidney, spleen and thymus cells from newborn Swiss mice after sc injections of Rauscher leukemia virus (RLV) were prepared. Although the kidney cultures failed, the spleen-thymus cultures attained their growth crisis between the 12th and 15th passages, at which the long fibroblastoid cells assumed increasingly epitheloid forms and islets of a novel cell type appeared. After a growth crisis following the 9th passage of a second line, similar cell configurations appeared between the 11th and 13 passages. A third line from passage 5 of the first line also exhibited the new cell type after 12 passages. Electron microscopy of the novel, rapidly growing cells identified both RLV and partly crystalloid forms of a polyoma-type DNA virus, which induced only partial cytopathic effects in mouse embryo cells. No intact cell was found that contained both viruses. (7 references)

6289 SEQUENCE HOMOLOGY BETWEEN MOLONEY MURINE SARCOMA VIRUS AND MOLONEY LEUKEMIA VIRUS RNA.

(Eng.) Bondurant, M. (Inst. Molecular Virology, St. Louis Univ. Sch. Medicine, St. Louis, MO 63119); Stoltzfus, C. M.; Mitchell, W. M. *J Virol* 19(1): 82-89; 1976.

The 4 x 10^6-dalton class of RNA from Moloney murine sarcoma-leukemia virus [M-MSV(MuLV)] was examined for base sequence homology with DNA complementary to the 7 x 10^6-dalton Moloney murine leukemia virus (M-MuLV) RNA genome. Approximately 86% of the M-MSV-(MuLV) was protected from RNase digestion by hybridization, whereas 95% of M-MuLV was protected under identical conditions. These results indicate that the RNA class of high multiplicity of infection M-MSV(MuLV) contains little (perhaps 10%) genetic information not present in M-MuLV. Virtually all of the 1.8 x 10^6-dalton subunits of M-MSV(MuLV) RNA contained regions of poly(A), since 94% of the RNA bound to oligo(dT) cellulose in 0.5 M KCl. This suggests that the 1.8 x 10^6-dalton subunits are formed before they are packaged into virions and that they are not formed from hydrolysis of intact 3.5 x 10^6-dalton subunits by a virion-associated nuclease. (18 references)

6290 ISOLATION OF A MURINE TYPE-C VIRUS p30 PRECURSOR PROTEIN BY DNA-CELLULOSE CHROMATOGRAPHY. (Eng.) Oroszlan, S. (Flow Labs., Inc., Rockville, MD 20852); Long, C. W.; Gilden, R. V. *Virology* 72(2): 523-526; 1976.

Single-stranded DNA (ssDNA)-cellulose chromatography techniques have been used to isolate and purify a stable viral protein precursor with a molecular wt of 70,000 (Pr 70) from mouse L929 cells. These cells were infected with a type C virus, and the virions are released extracellularly at a very slow rate. Anti-R-MuLV p30 serum was used to establish that the Pr 70 precursor was composed of authentic p30, the major structural protein of the virus. It is demonstrated that the Pr 70 precursor is stable for approximately 24 hr. The slow processing of viral protein precursors may be responsible for the slow virus release rate and the low yield of extracellular virus. This cellular system seems to be a good model for studies of viral assembly and for the purification of type C viral precursor proteins. The p30 protein was shown not to bind to ssDNA strands; therefore, the binding of Pr 70 must be mediated through a constituent polypeptide other than p30. It is suggested that this constituent protein is p10. (21 references)

6291 MURINE SARCOMA VIRUS PSEUDOTYPES ACQUIRE A DETERMINANT SPECIFYING N OR B TROPISM FROM LEUKEMIA VIRUS DURING RESCUE. (Eng.) Scher, C. D. (Harvard Medical Sch., Boston, MA 02115); Scolnick, E. M.; Siegler, R. *Nature* 256(5514): 223-226; 1975.

A series of focus assays were conducted to study the intracellular restriction mechanisms of N- and B-tropic murine leukemia viruses (MuLV) and murine sarcoma viruses (MSV) pseudotypes. The assays used three MSV-Moloney stocks rescued from MSV-transformed BALB/3T3 nonproducer cells with either N-, B- or NB-tropic MuLV. Each MSV stock was assayed on normal BALB/3T3 cells (B type), on a continuous line of C3H cells (N type) and on 3T3FL cells. MSV stocks rescued with either N- or B-tropic MuLV formed foci with equal efficiency in 3T3FL cells when assayed in the presence of optimal NB-tropic helper virus. MSV rescued with dual-tropic MuLV was equally efficient at focus formation in all three cell types. The stock of MSV rescued with N-tropic MuLV was about 200 times as efficient at focus formation on N-type C3H cells as on BALB/3T3, whereas the same MSV isolate rescued with B-tropic MuLV was only 1/20 as efficient at focus formation on C3H cells. Thus, there was
nearly a 4,000-fold variation in the focus format
ability of virus stocks prepared from this strain
MSV depending on the tropism of the rescuing help
virus. These data indicate that the infectivity o
MSV stocks were subject to FV-1 restriction and t
MSV pseudotypes were subject to the same intracel
restriction mechanism as N- and B-tropic MuLVs. T
tropism of the defective MSV particle is determin
by its helper MuLV; N- or B-tropism is, therefore
phenotypic helper-dependent characteristic of MSV
pseudotypes. (25 references)

6292 ANTIBODY TO MURINE LEUKEMIA VIRUS: GENE
CONTROL LINKED TO THE H-2 LOCUS IN PL
MICE. (Eng.) Nowinski, R. C. (Fred Hutchinson Car
Res. Center, 1124 Columbia St., Seattle, WA 9810
Doyle, T. *J Immunol* 117(1): 350-351; 1976.

Immune nonresponsiveness in mice of the highly
leukemic PL strain to endogenous ecotropic murin
leukemia viruses (MuLV) is described. PL and C57
mice were used to breed F_1 hybrid and backcross
mice. The former strain has a high incidence of
spontaneous leukemia, produces high titers of in
tious ecotropic MuLV, and has the H-2μ genotype.
latter strain has a low incidence of spontaneous
leukemia, does not produce infectious ecotropic
MuLV, and has the H-2b genotype. Radioimmune pre
tion assays demonstrated that PL and C57L mice c
tained low titers of antibody against AKR MuLV;
hybrid (PL X C57L) produced antibody at a level
higher than that of either parental strain. It w
suggested that the PL genome contributed the imm
genic virus to the hybrid and that the C57L geno
contributed a dominant immune response gene(s).
test these theories, a genetic backcross [PL X (
C57L)F_1 and (PL X C57L)F_1 X PL] was prepared. A
comparison between the production of antibody to
MuLV and the H-2 types showed a strong concordan
in the segregation of these two traits. Humoral
immune response to endogenous ecotropic MuLV in
and C57L mice was controlled by a gene that mapp
in the IXth linkage group. The PL strain had an
immune nonresponsive allele of the gene, and the
C57L strain had an immune responsive allele. (1
references)

6293 AMPHOTROPIC HOST RANGE OF NATURALLY O
RING WILD MOUSE LEUKEMIA VIRUSES. (En
Rasheed, S. (Dept. Pathology, Univ. Southern Ca
fornia Sch. Medicine, Los Angeles, CA 90033); G
ner, M. B.; Chan, E. *J Virol* 19(1): 13-18; 1976

Seven murine leukemia virus field isolates (unc
ed) from wild mice (*Mus musculus*) of four widel
separated areas in southern California showed a
unusually wide in vitro host range. They replic
well in human, feline, canine, guinea pig, rabb
rat, and mouse cells, whereas bovine, hamster,
avian cells were resistant. Since this host ran
included that of both mouse tropic (ecotropic)
xenotropic murine leukemia viruses, they were d
nated as amphotropic. No purely xenotropic viru
component was detectable in these field isolate
They may represent the wild or ancestral viruse
from which the ecotropic and xenotropic murine

virus strains of laboratory mice have been de-
d. (28 references)

NATURALLY OCCURRING MURINE LEUKEMIA VI-
RUSES IN WILD MICE: CHARACTERIZATION OF A
''AMPHOTROPIC'' CLASS. (Eng.) Hartley, J. W.
. Viral Diseases, Natl. Inst. Allergy and Infec-
s Diseases, Bethesda, MD 20014); Rowe, W. P. *J*
19(1): 19-25; 1976.

class of murine leukemia viruses (MuLV) iso-
from wild *Mus musculus* trapped in California
escribed. These amphotropic viruses replicated
ouse, rabbit, mink, human, guinea pig, and rat
, but not in hamster, quail, or duck cells.
showed N-tropism for mouse cells and did not
er the XC cell response. Interference and virus
alization testing showed that they are distinct
the previously recognized mouse-tropic and
ropic MuLV classes. Mouse-tropic viruses occur-
along with three of the four amphotropic iso-
were distinguishable by virus neutralization
other mouse-tropic murine leukemia virus strains
boratory mouse origin. (23 references)

NATURAL OCCURRENCE OF TUMORS IN MOUSE
STRAINS WITH DIFFERENT XENOTROPIC AND
OPIC ENDOGENOUS VIRUSES. (Eng.) Kelloff, G. J.
l Carcinogenesis Branch, Natl. Cancer Inst.,
Insts. Health, Public Health Service, U.S.
Health, Education, and Welfare, Bethesda, MD
); Peters, R. L.; Donahoe, R. M.; Stephenson,
; Aaronson, S. A. *J Natl Cancer Inst* 57(1):
; 1976.

al tumor incidence and type C virus expression
studied in NIH Swiss and BALB/c mice. The BALB/c
showed a moderate incidence of lymphoreticular
s containing infectious ecotropic virus. A
d class of lymphoreticular tumors occurred with
ximately the same incidence in both strains;
ugh infectious virus could not be isolated from
umors, they contained the antigens of a common
ropic virus. These xenotropic viral antigens
found in all the NIH Swiss and BALB/c tumors
ned and in normal hematopoietic tissues. (27
ences)

SYNTHESIS OF TYPE C VIRUS PARTICLES FROM
MURINE-CULTURED CELLS INDUCED BY IODODEOXY-
E. (Eng.) Wu, A. M. (Dept. Molecular Biology,
ics Res. Lab., Bethesda, MD 20014); Schultz,
llo, R. C. *J Virol* 19(1): 108-117; 1976.

thasone (dex) and interferon were used to
the mechanisms involved in the synthesis of
viruses in murine K-BALB cells following
ion of virus production by iododeoxyuridine
. Interferon inhibited the production of xeno-
C virus induced by IUdR from K-BALB cells
n the absence and presence of dex, but it did
fect the production of N-tropic C virus. Expo-
f the cells to interferon for longer than 12
required for maximum effect. Two types of
tory effects were observed: one diminished by
dex when the steroid was added 24 hr after interferon removal and the second resistant to dex. The concentration of intracellular group-specific antigen was diminished after interferon and increased after dex exposure. When induced cells were treated with both interferon and dex, the intracellular group-specific protein concentration was slightly increased, but virus production was reduced tenfold compared with induced cells treated with dex alone. It is concluded that interferon and dex may affect both the synthesis of viral proteins and the assembly or release of virus particles and that dex can partially nullify the inhibitory activity of interferon. The results also support previous conclusions that the regulatory mechanisms for the synthesis of viral proteins and for the release of viral particles may differ and that controls for xenotropic and ecotropic virus formation may not be identical. (25 references)

6297 AN ANTIGEN ASSOCIATED WITH MESSENGER RNA IN A TRANSFORMED HAMSTER CELL LINE. (Eng.) Mirault, M. E.; Reed, S. I.; Stark, G. R. *In: Tumor Viruses. Cold Spring Harbor Symposia on Quantitative Biology*. Cold Spring Harbor Laboratory. (Cold Spring Harbor, NY): vol. 39, pp. 295-303; 1975.

The X antigen was discovered in an attempt to obtain high-titer antisera against simian virus 40 (SV40) T antigen by incuding tumors in hamsters with SV40-transformed hamster-mouse hybrid cells. Hamsters carrying these tumors elaborate circulating antibodies with an activity that reacts by immunofluorescence or complement fixation with X antigen, a cytoplasmic protein present in large amounts only in C13/SV28 cells; it was not detected in all other cells examined. The X antigen seems to be associated with the polyribosomes of the cells. A sensitive assay specific for X antigen is discussed. Further studies indicate that X antigen may be bound to messenger ribonucleoproteins (mRNPs) in polyribosomes, in initiation complexes, and possibly in mRNPs free from ribosomes. It was determined that X antigen could be chased into lighter mRNP complexes by reaction with puromycin. Trypsin destroys about half of the antigen, suggesting that it is a protein or is bound to a protein. Two peaks of activity were found upon electrophoresis, one with a molecular wt of 64,000 and one with a molecular wt of 48,000. One protein of molecular wt 64,000 probably accounts for the major part of the X antigen. However, the possibility of X antigen as only one component of a multiprotein complex is not ruled out. Further study is needed to determine whether X antigen plays a role in initiating protein synthesis. (22 references)

6298 MUTUAL CONVERSION BETWEEN THE GENOMES OF ONCORNAVIRUSES AND ONCOGENIC DNA VIRUSES. (Eng.) Valladares, Y. (Dept. Biology and Biochemistry Cancer, Instituto Nacional de Oncologia, Ciudad Universitaria, Madrid-3, Spain); Alvarez, Y. *Rev Esp Oncol* 22(2): 389-394; 1976.

The reciprocal conversion of the genetic code of DNA and RNA viruses was demonstrated using cancervirus (CV), a polytumoral DNA virus, and Rous sarcoma virus (RSV), an RNA virus. Pure CV was injected into newborn mice, and messenger RNA was extracted from the resultant tumors. This mRNA was then injected into mouse embryo secondary cultures; after the eighth passage, the growth medium was shown to contain oncornavirus (RNA cancervirus, or CVR), apparently originating from the mRNA from DNA cancervirus-transformed cells. The viral RNA was isolated from the culture medium containing the CVR and characterized extensively. Linear density gradient centrifugation yielded four peaks of RNA. Peak I corresponded to infective 71S RNA from CVR. Peak IV was produced by degradation of CVR RNA, and peaks II and III corresponded to cellular RNA. Following the same procedures, CVR could be shown to produce CV. A similar reciprocal RNA-DNA conversion was obtained with RSV. It is suggested that CV lysogenized and, by a process of reverse induction, gave rise to CVR. CVR then underwent reverse transcription followed by reverse lysogenization, which, after induction, produced CV. (13 references)

6299 TRANSPLANTABLE SEBACEOUS ADENOMA OF THE MOUSE WITH VIRUS PARTICLES STUDIED BY ELECTRON MICROSCOPY. (Ger.) Ruhland, D. (Chirurgische Klinik und Poliklinik der Universitaet Muenster-Allgemeinchirurgie, D-4400 Munster, Jungeblodtplatz 1, West Germany); Fasske, E.; Fetting, R.; Themann, H. *Z Krebsforsch* 85(1): 51-62; 1976.

DNA from the cells of an immature myeloid leukemia in inbred NMRI mice was transplanted sc in a fresh NMRI litter. Three of the animals developed a fulminating leukemia, five died, and three were intolerant. One male developed a 3 x 3-cm nodule on the lateral abdominal wall that was characterized histologically as a solid sebaceous gland adenoma. Tumor preparations were injected sc or ip into other NMRI neonates with a 100% take rate in both sexes. Ascites and remote metastases were absent. Histologically, the tumor exhibited a typical well-differentiated mass of epithelial buds and connective tissue. In the germinal layer the cytoplasm was rich in ribosomes, mitochondria, Golgi apparatus, and rough endoplasmic reticulum. Virus particles were found in every tumor cell. A particles were usually associated with Golgi bodies. C particles were mainly concentrated on the cell surface, but they were rarely intercellular. The interior of the immature C buds resembled A particles. Neither the morphology of the virus particles nor the tumor histology was altered after 30 passages. The tumor probably represents a spontaneous occurrence elicited by a previously unknown RNA murine virus and is independent of the original myeloid leukemia. (16 references)

6300 INDUCTION OF ANGIOID SARCOMA AND FIBROSARCOMA BY A GUINEA PIG HERPESVIRUS-TRANSFORMED HAMSTER CELL LINE. (Eng.) Michalski, F. J. (Virology Lab., VA Hosp., West Haven, CT 06516); Fong, C. K.; Hsiung, G. D.; Schneider, R. D.; Kaplow, L. S. *Bibl Haematol (Basel)* (43): 400-402; 1976.

Tumors were induced in 18%-38% of newborns and in 50%-63% of weanling and adult hamsters inoculated with a guinea pig herpesvirus (GPHLV)-transformed hamster cell line at passage levels of 37 or highe Tumors appeared 4-28 wk after sc inoculation. The tumors were well-circumscribed and easily removed. Animals that had been injected ip developed tumor nodules that were implanted throughout the perito sometimes invading organs and often surrounding th spleen. The hamster tumors were fibrosarcomas. Fl capillary growth was present at the periphery of some tumors, suggesting the possibility of maligna endothelial cell proliferation. Tumor metastasis the lungs was seen in 6/38 animals examined. The tumor cells propagated rapidly in culture and fo confluent cell monolayers. Virus could not be iso from tumor cells or from the blood or spleen of tumor-bearing hamsters. Cultured tumor cells pass 4-20 times gave no evidence of spontaneous releas of virus. Sera from 20 tumor-bearing animals were examined for neutralizing activity against GPHLV, but none was found at the lowest dilution tested, 1:5. Four of 23 tumor-bearing hamster sera reacte with the nuclei of GPHLV-infected guinea pig embr cells in immunofluorescence tests. This nuclear fluorescence appeared to correspond to the develo ment of GPHLV nuclear inclusions in the infected cells and resembled the fluorescence observed in similarly infected cells that were reacted with antiserum specific for GPHLV. The number of cells showing nuclear fluorescence increased as the ti of GPHLV infection and the number of nuclear incl sions increased. (10 references)

6301 ISOLATION OF TWO FORMS OF SV40 NUCLEOPROTEIN CONTAINING RNA POLYMERASE FROM INFECTED MONKEY CELLS. (Eng.) Green, M. H. (Dept. Biology, Univ. California at San Diego, La Jolla, CA 92093); Brooks, T. L. *Virology* 72(1): 110-120; 1976.

Triton extraction of simian virus 40 (SV40)-infe ed monkey cells separated the viral transcriptio complex (VTC) into two fractions. Both forms of were comprised of viral DNA associated with RNA polymerase that had initiated RNA synthesis prio extraction. Approximately 20% of the total VTC c be solubilized by a variety of extraction condit while the remainder was pelleted together with t cellular chromatin or DNA. The proportion of VTC the pellet fraction was not altered by extractio a tenfold lower cell concentration or under cond tions that released most of the protein from chr tin and solubilized nearly all of the nonintegra SV40 DNA. The predominant template for SV40 tran tion at a late stage of infection was apparently associated with cellular DNA in vivo, or else it became selectively associated during extraction. Most of the Triton-soluble VTC, detected by endo nous RNA polymerase activity, sedimented somewha faster than the DNA-labeled SV40 chromatin, sugg ing that a minor fraction of the DNA was engage transcription. Treatment of the VTC with Sarkosy reduced its sedimentation rate from 50S-55S to 25S and enhanced the endogenous RNA polymerase ty by a factor of 3-5. It is thus likely that s cellular and/or viral proteins associated with DNA affect the rate of viral transcription in v (30 references)

MORPHOLOGICAL STUDIES ON CELL-FREE INDUCED SARCOMAS IN SYRIAN HAMSTERS.

(Ger.) Bender,
ntralinstitut fuer Krebsforschung, DDR-1115
-Buch, Lindenberger Weg 80, East Germany);
itowski, A.; Schramm, T.; Graffi, A. *Arch*
ılstforsch 46(2): 85-93; 1976.

stology of six different tumor types induced
ian hamsters by cell-free extracts containing
icles from hamster sarcomas is reviewed. The
erentiated sarcoma was predominant (24 cases).
uclei were polymorphic, with one or two nucle-
l frequent mitoses. The cells appeared mainly
egular strips, with clusters resembling Schwann
Signs of hemorrhage, necrosis, and leukocyte
ration were frequent. Other tumors resembled
comas, with a light cytoplasm and chromatin-
uclei in round cells. Cell clusters appeared
blasts. Fatty substances pervaded all affected
either diffusely or as droplets. Parts of the
appeared myxomatous, hemorrhagic, or necrotic.
posarcomas were found. Five neurofibromalike
were a third type, typified by well-separated
-shaped cells with elongated, chromatin-rich
and a slightly acidophilic cytoplasm. Cells
dered in irregular strips, with clusters of
rating Schwann cells. Other tumors of this
sembled neurilemmomas, with elongated nuclei
cal palisade formation. There was a plethora
agen and reticulin fibers. One tumor typical
abdomyosarcoma and one of an angiosarcoma
peared. Another, resembling an osteosarcoma,
in 1/78 rats inoculated with a cell-free
extract. A second tumor, remote from the
sc site, was found in two hamsters: one
a and one mesothelioma each in the peritoneal
(20 references)

DETECTION OF BOVINE LEUKOSIS-ASSOCIATED ANTIBODIES BY DIFFERENT TESTS.

(Eng.)
, B. (Federal Res. Inst. Animal Virus Diseases,
rlich-Strasse 28, D-74 Tubingen, West Ger-
Kaaden, O. R.; Mussgay, M.; Dietzschold, B.;
O. C.; Weiland, F. *Bibl Haematol (Basel)*
56-368; 1976.

ection of bovine leukosis-associated anti-
y the double-diffusion (DD), complement
(CF), indirect immunofluorescence (IIF),
complement immunofluorescence (ACIF) tests
pared with the results from hematological
total of 368 sera were tested. From 68
gically positive animals, 92.6% were positive
CIF, 70.6% in the IIF, and 51.4% in the DD
3.4% were considered suspect in the DD test.
hematologically suspect animals, 40.0% were
in the ACIF, 30.5% in the IIF, and 14.5% in
ests; 9.0% were suspect. From 245 hematolog-
egative animals, 12.2% were positive in the
1% in the IIF, and 1.6% in the DD tests;
e suspect. All five hematologically positive
tested in the CF test were positive. From
matologically suspect animals, 42.8% were
and from 58 hematologically negative animals
e positive in the CF test. These results
ood correlation between hematological data
detection of leukosis-associated antibodies
and indicate that ACIF provides a sensitive and reliable method for the detection of bovine leukosis-associated antibodies. (6 references)

6304 MAPPING SIMIAN VIRUS 40 MUTANTS BY CONSTRUCTION OF PARTIAL HETEROZYGOTES.

(Eng.) Mantei, N. (Univ. California Medical Center, San Francisco, CA 94143); Boyer, H. W.; Goodman, H. M. *J Virol* 16(3): 754-757; 1975.

Simian virus 40 (SV40) DNA fragments were used to map SV40 DNA (strains: VA45-54; its temperature-sensitive mutants (ts) A28, A30, B1, B11; also D101; and a derivative of strain 776). CV-1 cells were used for virus propagation. DNA was digested by restriction endonuclease *Eco*RI, *Hind*III or *Hind*. Fragments of wild-type DNA produced by *Hind*III, were separated by continuous elution electrophoresis. Cells were infected with DNA; after 5 days at 32 C, virions were harvested. To map mutants onto *Hind*III fragments, each separate fragment was mixed with *Hind*-digested plus *Eco*RI-digested (linear) ts DNA. After denaturation and reannealing, cells were inoculated at 32 C and virions were harvested after one growth cycle. For each mutant, a particular fragment of wild-type DNA gave a high titer of wild-type virus. Temperature-sensitive A28 and A30 were associated with *Hind*III-D, ts *B*1 and *B*11 with *Hind*III-A, and ts D101 with *Hind*III-E. Analogous experiments with *Hind* fragments gave similar results: each mutant was associated with a particular fragment ts *A*28 with *Hind*-I, *A*30 with *Hind*-H, *B*1 with *Hind*-F, *B*11 with *Hind*-G, and *D*101 with *Hind*-E.) DNA and restriction endonuclease fragment sequences of strain 776 were compared with those of strain VA45-54 by electron microscopy, and no relative changes were noted. Each ts mutant mapped in the same fragment of strain 776 DNA as in strain VA45-54. It is concluded that at least fragments E, F, G, H, and I are in the same order in the two strains.

6305 STRUCTURE OF A NICKED DNA-PROTEIN COMPLEX ISOLATED FROM SIMIAN VIRUS 40: COVALENT ATTACHMENT OF THE PROTEIN TO DNA AND NICK SPECIFICITY.

(Eng.) Kasamatsu, H. (Div. Biology, California Inst. Technology, Pasadena, CA 91125); Wu, M. *Proc Natl Acad Sci USA* 73(6): 1945-1949; 1976.

The stability of the virion DNA-protein complex was studied in various chemical agents. A portion of the nicked circular DNA isolated from purified simian virus 40 (SV40) contains a protein-DNA complex in which protein(s) is covalently attached to the end of a DNA single strand. (Nicked DNA is double-stranded DNA that contains at least one single-strand scission). The protein was visualized by electron microscopy and labeled in vitro with ^{125}I. The bond between the protein and the DNA was stable in alkali, 4 M guanidinehydrochloride, 3.86 M hydroxylamine (pH 4.23), and in 98% formamide. Most of the molecules in the nicked circular DNA fraction contained one nick. The nick occurred on either of the two complementary strands; the specific nick sites on the two strands were staggered, but lay within a few hundred nucleotides of each other. This indicates that the protein(s) that nicks DNA recognizes specific sequences, and it implies that the sequence occurs in a reverse order on the two strands at different locations. Preliminary data also suggest that a portion of the DNA in nicked circular DNA contains nicks on both strands of SV40 DNA. (15 references)

6306 DETECTION OF ADENOVIRUS TYPE 2-INDUCED EARLY POLYPEPTIDES USING CYCLOHEXIMIDE PRETREATMENT TO ENHANCE VIRAL PROTEIN SYNTHESIS.

(Eng.) Harter, M. L. (Inst. Molecular Virology, St. Louis Univ. Sch. Medicine, St. Louis, MO 63110); Shanmugam, G.; Wold, W. S.; Green, M. *J Virol* 19(1): 232-242; 1976.

^{35}S-Methionine-labeled polypeptides synthesized by adenovirus type 2-infected KB cells were analyzed by polyacrylamide gradient gel electrophoresis and autoradiography. Cycloheximide (CH) was added to infected cultures to accumulate early viral mRNA relative to host cell mRNA. This allowed viral proteins to be synthesized in increased amounts relative to host proteins after removal of CH and pulse-labeling with ^{35}S-methionine. During the labeling period arabinosylcytosine was added to prevent the synthesis of late viral proteins. This facilitated detection of six early viral-induced polypeptides, designated EP1 through EP6 (early protein), with apparent molecular wt of 75,000 (75K), 42K, 21K, 18K, 15K, and 11K, respectively. Supportive data were obtained by coelectrophoresis of ^{35}S- and ^{3}H-methionine-labeled polypeptides from infected and uninfected cells, respectively. Three of these early polypeptides have not been previously reported. CH pretreatment enhanced the synthesis rates of EP4 and EP6 twenty- to thirtyfold and enhanced that of the others approximately twofold. The maximal synthesis rates of the virus-induced proteins varied, in a different manner, with time postinfection and CH pretreatment. Since CH pretreatment appears to increase the levels of early viral proteins, it may be a useful procedure to assist in their isolation and functional characterization. (21 references)

6307 ISOLATION AND CHARACTERIZATION OF TEMPERATURE-SENSITIVE MUTANTS OF ADENOVIRUS TYPE 2.

(Eng.) Kathmann, P. (Inst. Genetics, Univ. Cologne, Cologne, West Germany); Schick, J.; Winnacker, E.-L.; Doerfler, W. *J Virol* 19(1): 43-53; 1976.

Fourteen temperature-sensitive mutants of human adenovirus type 2, which differed in their plaquing efficiencies at the permissive (32.5 C) and nonpermissive (39.5 C) temperatures by 4-5 orders of magnitude, were isolated. These mutants, comprising seven complementation groups, were tested for their capacity to synthesize adenovirus DNA at the nonpermissive temperature. Three mutants in three complementation groups proved deficient in viral DNA synthesis. The DNA-negative mutant H2ts206 complemented the DNA-negative mutants H5ts36 and H5ts125, whereas mutant H2ts201 complemented H5ts36 only. Among the DNA-negative mutants, H2ts206 synthesized the smallest amount of viral DNA at the nonpermissive temperature. Temperature shift experiments indicated that a very early function was involved in temperature sensitivity. In keeping with this, early virus-specific mRNA was not detected in cells infected with H2ts206 and maintained at 39.5 C. Prolonged hr) incubation of cells infected with H2ts206 at nonpermissive temperature led to the synthesis of high-molecular-wt form of viral DNA. (33 referenc

6308 MAPPING OF ADENOVIRUS MESSENGER RNA BY ELECTRON MICROSCOPY.

(Eng.) Westphal, (Lab. Molecular Genetics, Natl. Inst. Child Healt and Human Development, Bethesda, MD 20014); Meyer J.; Maizel, J. V., Jr. *Proc Natl Acad Sci USA* 73 2069-2071; 1976.

Late adenovirus messenger RNA extracted from pol somes of adenovirus type 2-infected KB cells was annealed at 47 C for 20 hr to complementary regi of partially melted viral double-stranded DNA in the presence of 0.5 M NaCl and 70% formamide. Th RNA-DNA hybrid regions within the DNA molecules visualized as loops in the electron microscope. occurred at several regions of the DNA, most fre ly, however, at a location near the center of th molecule. Each loop appeared to consist of a sin stranded (thin contour) and a double-stranded (t contour) branch. This hybridization technique ap to be well-suited for an accurate mapping of mes RNA, as well as for studies of RNA processing. references)

6309 REPLICATION OF ADENOVIRUS TYPE 5 DNA CELLS: LOCALIZATION AND FATE OF PAREN DNA DURING REPLICATION.

(Eng.) Vlak, J. M. (Dep Virology, Agricultural Univ., Binnenhaven 11, W gen, The Netherlands); Rozijn, T. H.; Spies, F. *Virology* 72(1): 99-109; 1976.

The localization and fate of parental adenoviru type 5 (Ad5) DNA in KB cells at the time viral replication occurs were investigated by electro microscope autoradiography and biochemical meth At 18 hr after infection most of the parental A DNA molecules were present in the nucleus. Abou of these were involved in viral DNA replication about 40% had not yet replicated at all. Electr microscope autoradiography of cells infected wi ^{3}H-labeled Ad5 revealed that replicating parent Ad5 DNA molecules were randomly distributed thr out the nucleus, while nonreplicating viral DN a preference to locate in the periphery of the us. (25 references)

6310 INITIATION OF ADENOVIRUS TYPE 2 DNA TION.

(Eng.) Bourgaux, P. (Departeme Microbiologie, Centre Hospitalier Universitair Universite de Sherbrooke, Sherbrooke, Quebec, J1H 5N4); Delbecchi, L.; Bourgaux-Ramoisy, D. *gy* 52(1): 89-98; 1976.

Viral DNA was labeled with short pulses of tri ed thymidine and selectively extracted with so deoxycholate 14-18 hr after low multiplicity i tion of monolayer KB cell cultures with adenov type 2. After it had been purified, viral DNA fractionated into partly single-stranded (repl ing) molecules and double-stranded (completed)

on columns of benzolyated-naphthoylated DEAE
cellulose. Completed molecules were cleaved
ndonuclease R_1 from *Escherichia coli* prior to
ophoresis through agarose-acrylamide slab
In agreement with previous results, tritium
ry in the resulting fragments indicated that
ation of replication occurred at the molecular
f the genome. Replicating molecules were ex-
to a single-strand specific nuclease from
pora crassa before being treated with endonucle-
, In this instance, maximal tritium recovery
served for the R_1 fragments corresponding to
nter of the adenovirus DNA molecule. These
s suggest that replication originates at the
of the molecule and proceeds in the direction
h ends. (24 references)

MECHANISMS OF INFECTION WITH EPSTEIN-BARR
VIRUS. I. VIRAL DNA REPLICATION AND FORMA-
F NONINFECTIOUS VIRUS PARTICLES IN SUPERINFECT-
I CELLS.

(Eng.) Yajima, Y. (Dept. Microbiology,
Illinois Medical Center, Chicago, IL 60612);
ma, M. *J Virol* 19(1): 187-194; 1976.

nfection of human lymphoblastoid Raji cells
pstein-Barr virus (EBV) was studied. The cells,
do not produce virus, supported the replica-
f EBV upon superinfection. Early antigen,
capsid antigen, and virions were produced in
ells superinfected with EBV. Viral DNA repli-
nder complete inhibition of host cell DNA
sis to the extent that a few micrograms of EBV
e recovered from 10^7 superinfected Raji cells,
onding to 5,000 viral genomes/cell. Homology
synthesized viral DNA to parental EBV DNA was
%. Virions produced by the Raji cells con-
a 55S DNA but failed to induce early antigen,
capsid antigen, and viral DNA synthesis after
d superinfection of Raji cells. (15 refe-
)

EPSTEIN-BARR VIRUS (EBV) EXPRESSION IN
TRANSFORMED HUMAN LYMPHOBLASTOID CELL
ROM DIFFERENT SOURCES.

(Eng.) Menezes, J.
Microbiology and Immunology, Univ. Montreal
iatric Res. Center, Ste-Justine Hosp., Mon-
3T 1C5, Canada); Joncas, J. H.; Patel, P.;
, W. *Bibl Haematol (Basel)* (43): 406-408;

an 100 Epstein-Barr virus (EBV)-transformed
lastoid cell lines (LCL) were examined by
luorescence for the expression of EBV-deter-
ntigens. These lines had been established
e following sources: cord blood lymphocytes
d peripheral blood lymphocytes from healthy
children under 4 yr of age, and from patients
fectious mononucleosis (IM). The following
LCL were used as the source of transforming
833L, derived from a patient with IM; (b)
armoset lymphocytes transformed by EBV from
e; and (c) QIMR-W-IL, derived from a patient
elocytic leukemia. Immunofluorescence tests
formed for early (EA), viral capsid (VCA),
(EBNA), and membrane antigens (MA). EBNA was
antigen common to all CBL lines and was
consistently present in 90%-100% of the cells. The restriction of viral replication and the expression of EA and VCA was more marked in cells transformed by the B95-8 strain of EBV than in cells transformed by EBV from the 833L and QIMR-W-IL lines. EBV replication and the expression of EA and VCA were less restricted in LCL established spontaneously (without an in vitro infection) than in LCL derived after an in vitro infection. These results indicate that human lymphocytes exert a strong control on EBV replication as well as on the expression of EBV-associated antigens, other than EBNA. This relatively unexpressed or restricted feature of EBV may represent a unique advantage of this virus against host defense mechanisms. (4 references)

6313 IN VITRO STIMULATION OF LYMPHOCYTES OF DONORS SERONEGATIVE FOR EPSTEIN-BARR VIRUS BY PREPARATIONS OF INACTIVATED EPSTEIN-BARR VIRUS.

(Eng.) Chang, R. S. (Dept. Medical Microbiology, Univ. California Sch. Medicine, Davis, CA 95616); Spina, C. A. *J Infect Dis* 133(6): 676-680; 1976.

Heat-inactivated preparations of Epstein-Barr virus (EBV) stimulated human lymphocytes, as assayed by the incorporation of [^{3}H]thymidine. The inactivated EBV stimulated the lymphocytes of all 5 seropositive donors, 11 of 14 seronegative donors (aged 8-26 yr), and none of 15 neonates. Control antigens prepared from a human lymphoid cell line devoid of the EBV genome did not stimulate the lymphocytes of seronegative donors. Fetal calf serum at the concentration used for suspension of EBV did not stimulate or only minimally stimulated the lymphocytes of seronegative donors. The reactivity of histocompatibility antigens on human lymphocytes was abolished by procedures used for virus inactivation. These results suggest that the lymphocyte-stimulating factor in the heat-inactivated EBV suspensions is probably not a histocompatibility antigen; general nonspecific mitogen such as phytohemagglutinin, staphylococcal filtrate, or blastogenic factor from activated lymphocytes; or calf serum. Although the factor may have no antigenic relation to EBV, the possibility exists that it is either an EBV or EBV-related antigen. (16 references)

6314 TRANSFORMATION OF LEUKOCYTES FROM SEROPOSITIVE INDIVIDUALS BY EPSTEIN-BARR VIRUS.

(Eng.) Hinuma, Y. (Dept. Microbiology, Kumamoto Univ. Medical Sch., Kumamoto, 860, Japan); Katsuki, T.; Yamamoto, N. *Bibl Haematol (Basel)* (43): 403-405; 1976.

An attempt was made to analyze quantitatively the susceptibility of tonsil leukocytes and adult peripheral blood leukocytes to Epstein-Barr virus (EBV) in comparison with that of cord leukocytes. Two strains of EBV were used, one produced from the B95-8 cell line and the other from the QIMR-WIL cell line. Infectivity titer assayed by a virus dilution endpoint method was expressed as 50% of the transforming dose (TD_{50}) in cord leukocytes. Eleven of 12 tonsil leukocyte specimens (92%) from children 5-10 yr old were transformed by $10^{4.8}$ - $10^{5.2}$ TD_{50}/ml of B95-8 virus. Only 13/25 specimens (52%) from older children and adults (11-34 yr old) were transformed by the same dose, which transforms cord leukocytes with an efficiency of 100%. When QIMR-WIL virus was used, transformation occurred, but the incidence was not high. Anti-viral capsid antigen (anti-VCA) titers were determined in sera of 19 persons whose tonsil leukocytes had been tested for transformation by B95-8 virus; titer of the antibody was not directly related to transformation rates. The results suggest that tonsil leukocytes are a target of EBV and may play an important role in natural transmission of the virus. Eight adult leukocyte preparations showed a lower efficiency of transformation by B95-8 virus than did eight cord leukocyte preparations. There was no relationship between the efficiency of transformation of adult leukocytes and the titer of anti-VCA in the donor's serum. Efficiency of transformation (colony-forming units, CFU) in adult leukocytes was compared with that in cord leukocytes by use of clonal transformation in soft agar. A B95-8 virus stock that gave 500-3,800 CFU/ml in 11 cord leukocyte specimens showed only 30 CFU/ml or less in four adult leukocyte preparations, suggesting that adult leukocytes are less susceptible to EBV than cord leukocytes. (11 references)

6315 ANTIBODY-DEPENDENT CELLULAR CYTOTOXICITY (ADCC) AGAINST EPSTEIN-BARR VIRUS-DETERMINED MEMBRANE ANTIGENS. (Eng.) Jondal, M. (Dept. Tumor Biology, Karolinska Inst., 104 01 Stockholm 60, Sweden). *Clin Exp Immunol* 25(1): 1-5; 1976.

Epstein-Barr virus (EBV) causes infectious mononucleosis (IM) and plays some role in the etiology of Burkitt's lymphoma (BL) and nasopharyngeal carcinoma (NPC). The capacity of antigens to induce antibody-dependent cellular cytotoxicity (ADCC) against EBV-infected lymphoid cell lines was investigated. Reactive antibodies were found in sera from normal EBV-positive persons, but not in sera from normal EBV-negative or IM patients. The sera from the IM patients contained EBV-specific killer T cells but did not incude ADCC. It may be that the T cell and ADCC reactivities act on EBV-infected cells during different stages of the viral cycle and are required during the acute and chronic phases of the EBV infection, respectively. The ADCC test is efficient for EBV-reactive antibodies and, therefore, may be useful for the diagnosis and prognosis of IM, BL, and nasopharyngeal carcinoma. (19 references)

6316 EFFECT OF ZINC IONS ON SYNTHESIS OF HERPES SIMPLEX VIRUS TYPE 2-INDUCED POLYPEPTIDES. (Eng.) Gupta, P. (Dept. Microbiology, Milton S. Hershey Medical Center, Pennsylvania State Univ., Coll. Medicine, Hershey, PA 17033); Rapp, F. *Proc Soc Exp Biol Med* 152: 455-458; 1976.

The effects of zinc ions on protein synthesis in herpes simplex virus type 2 (HSV-2) have been determined. Zinc ions at a concentration of 0.05 mM and higher inhibited virion synthesis. A concentration of up to 0.1 mM had a slight inhibitory effect on virus DNA synthesis, but at 0.2 mM, viral DNA synthesis was decreased markedly. Zinc ions at 0.1 mM the synthesis of most of the viral polypeptides was
inhibited. This concentration also prevented virus
progeny formation. The mechanism by which zinc io
inhibit herpesvirus-induced polypeptides has not
been determined. (6 references)

6317 COMPARISON OF HERPES SIMPLEX VIRUS ISO-
LATES USING A QUANTITATIVE SELECTION AS
FOR TRANSFORMATION. (Eng.) Rapp, F. (Dept. Microb
logy, Milton S. Hershey Medical Center, Pennsylva
State Univ. Coll. Medicine, Hershey, PA 17033);
Buss, E. R. *Intervirology* 6(2): 72-82; 1976.

The transformation potential of herpes simplex
virus types 1 and 2 (HSV-1 and HSV-2) was compare
quantitatively in a system selecting for biochemi
transformants using thymidine kinase, mouse 3T3
cells, and infection in suspension. The highest
transformation frequency was obtained with HSV-2
strain 333. The transformation rates for two stra
of HSV-1 were lower and distinctly different from
HSV-2 and from each other. The dose of inactivati
UV radiation received by the virus and the multip
ty of infection were critical components of the
procedure. Clones of these biochemically transfor
cells expressed HSV-specific antigens, altered ce
morphology, and increased levels of thymidine ki
activity. Isolates of HSV-1 recovered from the sa
site 11 yr apart yielded similar transforming fre
quencies. These results suggest that this assay
should prove useful in further characterizing th
biological properties of HSV. (17 references)

6318 RNA TUMOR VIRUS-LIKE ACTIVITIES IN HUM
SOLID TISSUES: ENDOGENOUS RNA:DNA POLY
ASE ACTIVITIES IN THE PROSTATE. (Eng.) Arya, S.
(Dept. Medical Viral Oncology, Roswell Park Memo
Inst., Buffalo, NY 14263); Zeigel, R. F.; Horosz
J. S.; Carter, W. A. *J Surg Oncol* 8(4): 321-332;
1976.

Several human prostatic tissues were examined f
possible particles and associated DNA polymerizi
activity generally associated with the type C R
tumor virus family. Partially purified tissue e
tracts, when centrifuged to equilibrium in sucr
gradients, yielded fractions that contained act
mycin D-resistant, endogenous DNA polymerase act
this activity banded at a density of 1.15-1.18
Further analysis of the endogenous products by
gradient sedimentation suggested the presence o
high molecular wt RNA:DNA hybrids. However, most
of the DNA products synthesized in these endoge
reactions sedimented in much lower molecular we
regions of these sucrose gradients. Clearly, th
relative distributions of high and low molecula
wt products could critically depend on the nuclease content of the subcellular fraction, and
prostate could be relatively enriched in nuclea
Further, oligo (dT) stimulated the endogenous D
polymerase activity contained in these extracts
omission of one of the DNA precursor nucleotide
depressed it, making it unlikely that terminal
ferase activity, rather than genuine DNA polyme
tion, was being measured primarily. Because of
spectrum of molecular wt classes formed by thes
DNA:RNA hybrids, as well as their apparent pres

normal prostatic tissue, it was difficult to
ribe their presence either to the presence of
ical type C RNA viruses or to the exclusive be-
ior of the neoplastic prostatic tissue. The results
port the growing evidence for functions similar
those of type C RNA viruses being relatively
e-spread in human tissues without the apparent
essity for an etiologic role in neoplastic produc-
n. (17 references)

9 C-TYPE VIRUS EXPRESSION IN SYSTEMIC LUPUS ERYTHEMATOSUS. (Eng.) Panem, S. (Dept.
nology, Univ. Chicago, Pritzker Sch. Medicine,
cago, IL 60637); Ordonez, N. G.; Kirstein, W. H.;
, A. I.; Spargo, B. H. *N Engl J Med* 295(9):
-475; 1976.

neys from patients with lupus nephropathy, non-
s immune-complex glomerulonephritis, and other
l diseases were examined by indirect immunofluo-
ence for antigens related to a type C human
s (HEL-12). All 11 specimens of lupus nephropathy
ained HEL-12 virus antigens deposited in the
pattern as the immune complexes. The intensity
mmunofluorescence with anti-HEL-12 virus serum
elated with the extent of immune-complex deposi-
. In contrast, nine renal lesions other than
s nephropathy and seven normal tissues did not
t with the serum. Antibody eluted from one kid-
with lupus nephropathy reacted by indirect immuno-
rescence with infected human and dog cells but
with uninfected control cells. These findings
nstrate a specific association of lupus nephro-
y with a C viral antigen deposited as an antigen-
viral antibody complex. (26 references)

THE SEARCH FOR 'VIROGENE' IN HUMAN PROSTATIC TISSUES: PROSTATIC DNA POLYMERASES.
.) Arya, S. K. (Dept. Medical Viral Oncology,
, 666 Elm St., Buffalo, NY 14203); Carter, W.
Ziegel, R. F.; Horoszewicz, J. S. *Cancer Chemo-*
Rep (Part I) 59(1): 39-46; 1975.

DNA polymerases of hypertrophic human prostate
ue were studied. Lysosomes were removed by cen-
ugation, and the remaining subcellular fractions
submitted to sonication and subsequent high-
d centrifugation. The supernatant material was
matographed on DEAE-cellulose ascending 0-0.6 M
gradient; the eluted fractions containing poly-
se activity with poly[d(A-T)] as template were
ed and applied, after concentration, to a phos-
ellulose column. The applied material was eluted
a linear 0.1-0.6 M gradient of NaCl in a Tris/
/dithiothreitol/glycerol buffer. The eluted
tions were analyzed for DNA polymerase activity
g poly[d(A-T)], activated DNA, and poly(A)•oligo-
as templates. Three peaks of polymerase activity
observed, centered at 0.32, 0.40, and 0.45 M
(α, β, and γ respectively). The activity of α
labile at 4 C; its activity disappeared during
days. The polymerase activity/mg of the α frac-
was only 5%-8% of the γ or β activities. No
er observations on the α activity are reported.
the β and γ activities preferred poly[d(A-T)]
ctivated DNA over poly(A)•oligo(dT) as template
and were not inhibited by poly(2'-O-ethyl)adenylic acid, a selective inhibitor of oncornaviral reverse transcriptase. It is concluded that the β and γ activities are cellular DNA polymerases and not reverse transcriptases of viral origin. (24 references)

6321 HYPERGAMMAGLOBULINEMIA IN CHICKENS CONGENITALLY INFECTED WITH AN AVIAN LEUKOSIS VIRUS. (Eng.) Qualtiere, L. F. (Dept. Microbiology, Mayo Clinic, Rochester, MN 55901); Meyers, P. *J Immunol* 117(4): 1127-1131; 1976.

6322 COVALENTLY CLOSED CIRCULAR DNA OF AVIAN SARCOMA VIRUS: PURIFICATION FROM NUCLEI OF INFECTED QUAIL TUMOR CELLS AND MEASUREMENT BY ELECTRON MICROSCOPY AND GEL ELECTROPHORESIS. (Eng.) Guntaka, R. V. (Dept. Microbiology, Coll. Physicians and Surgeons, Columbia Univ., New York, NY 10032); Richards, O. C.; Shank, P. R.; Kung, H.-J.; Davidson, N.; Fritsch, E.; Bishop, J.M.; Varmus, H. E. *J Mol Biol* 106(2): 337-357; 1976.

6323 POLY 2'-O-ETHYLCYTIDYLATE, AN INHIBITOR AND POOR TEMPLATE FOR AMV REVERSE TRANSCRIPTASE. (Eng.) Mikke, R. (Inst. Oncology, 02-034 Warszawa, Poland); Kielanowska, M.; Shugar, D.; Zmudzka, B. *Nucleic Acids Res* 3(6): 1603-1611; 1976.

6324 LYMPHOPROLIFERATIVE DISEASES OF FOWL: CHROMOSOME BREAKS CAUSED IN LYMPHOCYTES BY JM-V HERPESVIRUS. (Eng.) Yoon, J. W. (Natl. Inst. Dental REs., Natl. Insts. Health, Public Health Service, U.S. Dept. Health, Education, Welfare, Bethesda, MD 20014); Kim, S. N.; Hahn, E. C.; Kenyon, A. J. *J Natl Cancer Inst* 56(4): 757-762; 1976.

6325 FURTHER STUDIES OF EEL VIRUS (BERLIN) ISOLATED FROM THE BLOOD OF EELS (*ANGUILLA ANGUILLA*) WITH SKIN PAPILLOMA. (Eng.) Schwanz-Pfitzner, I. (Robert Koch-Institut des Bundesgesundheitsamtes, D-1 Berlin, West Germany). *Prog Exp Tumor Res* 20: 101-107; 1976.

6326 STRUCTURE OF THE MENGO VIRION. IV. AMINO- AND CARBOXYL-TERMINAL ANALYSES OF THE MAJOR CAPSID POLYPEPTIDES. (Eng.) Ziola, B. R. (Dept. Virology, Univ. Turku, Turku, Finland); Scraba, D. G. *Virology* 71(1): 111-121; 1976.

6327 BRIEF COMMUNICATION: VIRUS-LIKE PARTICLES IN GEOMETRIC TUBULORETICULAR STRUCTURES. (Eng.) Vernon, M. L. (Microbiological Assocs., Bethesda, MD 20014); Price, P. J. *J Natl Cancer Inst* 56(4): 855-857; 1976.

6328 MECHANISM OF GENETIC RESISTANCE TO IMMUNE SUPPRESSION BY FRIEND LEUKEMIA VIRUS: THE ROLE OF MARROW-DEPENDENT CELLS. (Eng.) Kumar, V. (Dept. Pathology, Boston Univ. Sch. Medicine, Boston, MA 02118); Eckner, R. J.; Bennett, M. *Ann NY Acad Sci* 276: 217-228; 1976.

6329 BRIEF COMMUNICATION: HUMORAL IMMUNE RESPONSES OF CATS TO FELINE LEUKEMIA VIRUS: COMPARISON OF RESPONSES TO MAJOR STRUCTURAL PROTEIN P30 AND TO A VIRUS-SPECIFIC CELL MEMBRANE ANTIGEN (FOCMA). (Eng.) Charman, H. P. (Flow Lab., Inc., 1710 Chapman Ave., Rockville, MD 20852); Kim, N.; Gilden, R. V.; Hardy, W. D., Jr.; Essex, M. *J Natl Cancer Inst* 56(4): 859-861; 1976.

6330 XENOGENIZATION OF RAT ERYTHROID CELLS BY LYMPHATIC LEUKEMIA VIRUS: ITS ROLE IN INDUCTION OF AUTOIMMUNE HEMOLYTIC ANEMIA. (Eng.) Kuzumaki, N. (Lab. Pathology, Cancer Inst., Hokkaido Univ. Sch. Medicine, Sapporo, Japan); Moriuchi, T.; Kodama, T.; Kobayashi, H. *J Immunol* 117(4): 1250-1255; 1976.

6331 CHARACTERIZATION OF IA8 ANTIGEN, THY-1.2 ANTIGEN, COMPLEMENT RECEPTORS, AND VIRUS PRODUCTION IN A GROUP OF MURINE VIRUS-INDUCED LEUKEMIA CELL LINES. (Eng.) Chesbro, B. (Rocky Mountain Lab., Natl. Inst. Allergy and Infectious Diseases, NIH, Public Health Service, United States Dept. Health, Education, and Welfare, Hamilton, MT 59840); Wehrly, K.; Chesbro, K.; Portis, J. *J Immunol* 117(4): 1267-1274; 1976.

6332 BRIEF COMMUNICATION: INHIBITION OF CELL-MEDIATED CYTOTOXICITY AGAINST TUMOR-ASSOCIATED ANTIGENS BY SUPPRESSOR CELLS FROM TUMOR-BEARING MICE. (Eng.) Glaser, M. (Lab. Cell Biology, Natl. Cancer Inst., Natl. Insts. Health, Bethesda, MD 20014); Kirchner, H.; Holden, H. T.; Herberman, R. B. *J Natl Cancer Inst* 56(4): 865-867; 1976.

6333 CELLULAR POOLS OF VIRAL PROTEINS IN 3T3 CELLS CHRONICALLY INFECTED WITH MOLONEY-MURINE LEUKEMIA VIRUS. (Eng.) Forchhammer, J. (Fibiger Lab., Ndr. Frihavnsgade 70, DK 2100 Copenhagen O, Denmark); Nexo, B. A.; Vaughan, M. H., Jr. *Virology* 71(1): 134-142; 1976.

6334 HISTOPATHOLOGICAL AND VIROLOGICAL INVESTIGATIONS OF PAPILLOMAS IN SOLES AND GOBIES IN COASTAL WATERS OF JAPAN. (Eng.) Ito, Y. (Dept. Microbiology, Faculty Madicine, Univ. Kyoto, Sakyo-Ku, Kyoto 606, Japan); Kimura, I.; Miyake, T. *Prog Exp Tumor Res* 20: 86-93; 1976.

6335 ANTIGENIC CHARACTERIZATION OF C-TYPE O
NAVIRUS ISOLATED FROM LYMPHOMATOUS BAB
(PAPIO HAMADRYAS). (Eng.) Voevodin, A. F. (USSR
Acad. Medical Sciences, Inst. Experimental Patho
and Therapy, P. B. 66, Gora Trapetziya, Sukhumi,
USSR); Lapin, B. A. *Arch Geschwulstforsch* 46(2):
105-109; 1976.

6336 INVESTIGATION OF THE STRUCTURE OF POLI
AND HUMAN RHINOVIRIONS THROUGH THE USE
SELECTIVE CHEMICAL REACTIVITY. (Eng.) Lonberg-Ho
K. (Central Res. Development Dept., E. I. du Pon
Nemours and Co., Wilmington, DE 19898); Butterwo
B. E. *Virology* 71(1): 207-216; 1976.

6337 BRIEF COMMUNICATION: HAMSTER EPENDYMOM
PRODUCED BY INTRACEREBRAL INOCULATION
HUMAN PAPOVAVIRUS (MMV). (Eng.) Costa, J. (Natl.
Cancer Inst., Natl. Insts. Health, Public Health
Service, U. S. Dept. Health, Education, Welfare,
Bethesda, MD 20014); Tralka, T. S.; Rabson, A.
Natl Cancer Inst 56(4): 863-864; 1976.

6338 EXPRESSION OF TRANSFORMATION IN CELL
BRIDS. I. ISOLATION AND APPLICATION O
DENSITY-INHIBITED BALB/3T3 CELLS DEFICIENT IN H
ANTHINE PHOSPHORIBOSYLTRANSFERASE AND RESISTANT
OUABAIN. (Eng.) Jha, K. K. (Worcester Foundatio
Experimental Biology, Shrewsbury, MA); Ozer, H.
Somatic Cell Genet 2(3):215-223; 1976.

6339 CHARACTERIZATION OF HOST-RANGE AND TE
PERATURE-SENSITIVE MUTANTS OF ADENOVI
TYPE 5 WITH PARTICULAR REGARD TO TRANSFORMATION
HAMSTER EMBRYO CELL LINE (NIL). (Eng.) Minekawa
(Res. Inst. Microbial Diseases, Osaka Univ., Su
Osaka, Japan); Ishibashi, M.; Yasue, H.; Takaha
M. *Virology* 71(1): 97-110; 1976.

6340 ANTIBODIES TO EPSTEIN-BARR VIRAL CAPS
AND EARLY ANTIGENS ASSOCIATED WITH BU
LYMPHOMA AND LYMPHOBLASTIC LYMPHOSARCOMA IN ISR
(Eng.) Gotlieb-Stematsky, T. (Sackler Sch. Medi
Tel-Aviv Univ., Tel-Aviv, Israel); Ramot, B.;
sover, A.; Aghai, E.; Kende, G.; Ninio, M.; Mod
M. *J Natl Cancer Inst* 56(4): 721-723; 1976.

6341 EPSTEIN-BARR VIRUS IN AN AMERICAN PA
WITH BURKITT'S LYMPHOMA: DETECTION O
VIRAL GENOME IN TUMOR TISSUE AND ESTABLISHMENT
TUMOR-DERIVED CELL LINE (NAB). (Eng.) Gravell,
(Natl. Inst. Neurological and Communicative Di
and Stroke, Natl. Insts. Health, Bethesda, MD

vine, P. H.; McIntyre, R. F.; Land, V. J.; Pagano,
S. *J Natl Cancer Inst* 56(4): 701-704; 1976.

42 SOLUBILIZATION AND PURIFICATION OF SURFACE
ANTIGEN OF CELLS TRANSFORMED BY ADENOVIRUS
PE 12. (Eng.) Vasconcelos-Costa, J. (Institut
isse de Recherches Experimentales sur le Cancer,
usanne, Switzerland). *Virology* 71(1): 122-133;
76.

See also:

* (Rev): 6015, 6016, 6017, 6018, 6019, 6020, 6021, 6022, 6023, 6025, 6026, 6065, 6078, 6079, 6080, 6081, 6082, 6083, 6084, 6085, 6086, 6087, 6091, 6097, 6120
* (Chem): 6223
* (Phys): 6562
* (Immun): 6346, 6355, 6378, 6380
* (Path): 6455, 6472, 6486

6343 MEDIATION OF CYTOTOXIC IMMUNE RESPONSES AGAINST HUMAN TUMOR-ASSOCIATED ANTIGENS BY XENOGENEIC IMMUNE RNA.

(Eng.) Kern, D. H. (Dept. Surgery, Harbor General Hosp., Torrance, CA 90509); Fritze, D.; Drogemuller, C. R.; Pilch, Y. H. *J Natl Cancer Inst* 57(1): 97-103; 1976.

Xenogeneic immune RNA (I-RNA), extracted from the lymphoid organs of sheep or guinea pigs immunized with human tumor cells, mediated in vitro cytotoxic immune responses that were directed specifically against tumor-associated antigens of human tumor target cells (gastric carcinoma, malignant melanoma, and carcinoma of the breast). Normal human peripheral blood lymphocytes from healthy donors become much more cytotoxic for human tumor target cells after being incubated with I-RNA extracted from the lymphoid organs of animals that had been immunized with that particular tumor. Lymphocytes incubated with RNA from animals immunized with only complete Freund's adjuvant evidence no increased cytotoxic activity. RNA extracted from the lymphoid organs of animals immunized with normal skin fibroblasts that were autologous to the immunizing tumor, when incubated with normal allogeneic lymphocytes, also mediated cytotoxic immune reactions against tumor target cells. These immune responses probably were directed principally against normal transplantation antigens. However, when lymphocytes autologous to the immunizing tumor and/or the tumor target cells were incubated with RNA from animals immunized with autologous normal fibroblasts, cytotoxicity did not increase. Only I-RNA extracted from donor animals specifically immunized with tumor cells mediated cytotoxic antitumor immune responses when incubated with autologous lymphocytes. The results support the hypothesis that a recognition of self occurred during these reactions; therefore no immune reactions against self cell-surface antigens were initiated by xenogeneic I-RNA. (18 references)

6344 IMMUNOCYTOLOGIC LOSSES OF ISOANTIGENS A, B, AND H (O) IN THE ENDOMETRIUM AND BRAIN.

(Eng.) Gupta, R. K. (Dept. Pathology, St. Catharine's General Hosp., 142 Queenston St., St. Catharine's, Ontario, L2R, 7C6, Canada). *Am J Clin Pathol* 66(2): 390-394; 1976.

Formalin-fixed tissues from 100 human endometria and 50 human brains were grouped and studied by the mixed-cell agglutination reaction (MCAR) for studying isoantigens A, B, and H (O). MCARs were negative in all 45 of the endometria from subjects with endometrial carcinomas, but they were positive in the epithelium of endometrial glands of the remaining 55 subjects (cyclic phases of endometrium and benign lesions). MCARs were negative in all benign and malignant brain tumors and normal brain tissues used. In view of the present findings and in the light of previous observations, the isoantigen loss in adenocarcinomas is greater than such losses in other types of malignancies so far studied. The cause of the negative MCARs in normal brain tissue and brain tumors may be attributable to lack of isoantigens in normal brain tissue. (11 references)

6345 STUDIES ON THE IMMUNE RESPONSE TO FIXED ANTIGENS. PREFERENTIAL INDUCTION OF HEL FUNCTION WITH HEAVILY TRINITROPHENYLATED SHEEP ER ROCYTES, AND GLUTARALDEHYDE-TREATED SHEEP ERYTHROCYTES.

(Eng.) Kahan, M. (Lautenberg Center for Ge eral Tumor Immunology, The Hebrew Univ., Hadassah Medical Sch., Jerusalem, Israel); Berman-Goldman, R.; Saltoun, R.; Naor, D. *J Immunol* 117(1): 16-22 1976.

Investigations were made of the ability of chemically modified fixed antigens to stimulate thymu derived carrier-seeking helper cells. Mice primed with heavily trinitrophenylated sheep red cells (TNP$_{128}$SRC) or glutaraldehyde-treated sheep red cells (G-SRC) developed an early helper function mediated by thymus-derived cells. These mice were able to produce high secondary responses to both hapten and carrier after challenge 2 days after priming, with lightly trinitrophenylated SRC (TNP $_{0.14}$SRC). However, the primary responses of the T P$_{128}$SRC or G-SRC-primed mice were very low to und tectable; their secondary responses were also low when the challenge antigen was administered 4 day after priming or later. Inhibitory humoral factor that were induced in the primed animals appeared responsible for the decreased capacity of primed mice to mount a secondary response when challenge later than 2 days after priming. Transfer of sple cells from TNP$_{128}$SRC-primed mice to sublethally irradiated recipients circumvents their exposure inhibitory humoral factor(s) present in intact an mals, allowing them to react with challenge antig Enriched populations of T cells, but not B cells were able to transfer this early immunologic mem to irradiated recipients. It is suggested that ch ical modification of the antigen reduced its bin affinity to specific cell receptors. Hence, T ce that might need lower binding energy than B cell for activation are stimulated, resulting in mere thymus-dependent responses. Practical implicatio of this possibility include improvement of antit responses by vaccination with chemically modifie tumor cells after establishment of a strong help function that can recognize the chemical reagent (25 references)

6346 AGE-RELATED CHANGES IN CELL SURFACE AN GENS OF PRELEUKEMIC AKR THYMOCYTES. (E

Kawashima, K. (Nagoya Univ. Sch. Medicine, Nagoy Japan); Ikeda, H.; Stockert, E.; Takahashi, T.; L. J. *J Exp Med* 144(1): 193-208; 1976.

Thymocytes from preleukemic AKR mice aged 5-6 mo have an altered pattern of cell surface antigens The expression of four murine leukemia virus (Mu related antigens on the cell surface (Gix, GCSA, gp70, p30) is markedly increased in comparison that of 2-mo-old AKR mice and approximates the heightened levels of these antigens found on thy leukemia cells. H-2 and Thy-1 alloantigens also characteristic modifications in relation to age leukemia development. In contrast to the high Th 1/low H-2 levels on 2-mo-old AKR thymocytes, thy cytes from 6-mo-old mice and thymic leukemia cel frequently show a low Thy-1/high H-2 surface ph

Because thymocytes from mouse strains with a
ncidence of leukemia do not show these changes,
appear to represent a stage in the conversion
rmal cells to leukemia cells; i.e., the cell
ation that is undergoing the age-dependent
e in surface phenotype also appears to be the
hat is at highest risk for leukemia transforma-
Under the influence of the thymic environment,
mmigrant cells engage in intense mitotic activ-
nd undergo the phenotypic changes. (40 refer-
)

CLONAL VARIATIONS IN MURINE NEUROBLASTOMA:
MORPHOLOGIC AND ANTIGENIC DIFFERENTIATION.
) Akeson, R. (UCLA Sch. Medicine, Los Angeles,
024); Herschman, H. R. *Exp Cell Res* 93(2):
95; 1975.

e neuroblastoma clones (N18, N12, N4, N1E-115,
C10, CIA, 10D, W2, L, SAI, and AC) were ex-
d for clonal variations in morphology and anti-
maturation. For morphology studies, cells that
d processes at least three times longer than
ody diameter were scored as differentiatiated.
n varied from clone to clone; for N18 the aver-
ength was 10 to 20 times the cell diameter.
ng of ^{125}I-IgG in serum-free medium also varied
clone to clone, often increasing with differen-
on (due to new antigens on the cell surface).
tested with unadsorbed ^{125}I-IgG, four clones
N12, N4, C10) showed substantially increased
ng. NS20 showed good process formation but had
slightly increased binding. All three clones
weak process forming abilities (W2, CIA, and
had decreased binding ability, apparently due
e loss of antigens during differentiation. The
non-neuronal lines did not elaborate processes
howed either little change in binding ability
and AC) or a loss (L). The cell lines were
fied into three groups: those that differen-
d morphologically and antigenically (N4, N12,
and C10), those that differentiated morpholog-
but not in the same antigenic manner as N18
15, NS20): and those that formed either few or
cesses and did not differentiate morphologically
0D, CIA, L, SAI, AC). All clones in which more
/3 of the cells elaborated processes expressed
f these differentiation antigens. The level of
sion observed was not all or none but a con-
of values. It is suggested that the specific
ns observed may be related to other neuronal
lities of that clone. (9 references)

EFFECTS OF CHEMICAL MODIFICATION OF THE
PROTEIN ON THE ANTIGENIC ACTIVITY OF CAR-
BRYONIC ANTIGEN. (Eng.) Thomas, P. (Chester
Research Inst., Inst. Cancer Res. Royal Can-
sp., Fulham Road, London, SW3, 6JB, England);
s, R. G.; Westword, J. H. *Biochem Soc Trans*
513-515; 1976.

tibodies in goat anti-(carcinoembryonic anti-
EA)) antisera are directed toward determinants
sing sections of the protein part of CEA. Substitution of the chemically more accessible tryptophan, tyrosine, arginine, and histidine residues of native antigen produces no significant loss of antigenic activity. Complete substitution of tryptophan and tryosine caused the loss of most of the antigenic activity. This loss is thought to be due to changes in the conformation of the protein. (11 references)

6349 κ AND λ LIGHT CHAIN DISEASE: SURVIVAL RATES AND CLINICAL MANIFESTATIONS. (Eng.) Shustik, C. (Immunoglobulin Diagnostic Res. Centre, Dept. Medicine, Wellesley Hosp., Univ. Toronto, Toronto, Ontario, Canada); Bergsagel, D. E.; Pruzanski, W. *Blood* 48(1): 41-51; 1976.

Ninety-seven patients with light chain disease (LCD) were studied to determine if the short survival of λ-LCD patients as opposed to κ-LCD patients was related to a higher incidence of manifestations indicating poor prognosis. The median survival from diagnosis was 30 mo for 52 patients with κ-LCD and 10 mo for 45 patients with λ-LCD. A lower proportion of κ-LCD patients (15.7%) than λ-LCD patients (42.2%) died within 5 mo of diagnosis. The survival of the remaining patients with κ-LCD was still much longer than of those with λ-LCD. The shorter survival of λ-LCD patients could not be ascribed to an increased incidence of recognized manifestations, indicating a poor prognosis, the incidence of amyloidosis, the clinical stage of the disease at diagnosis, or the response to treatment. A comparison of the clinical manifestations of LCD with those of other myelomas revealed some differences. LCD patients were slightly younger than IgA and IgG patients but older than IgD patients. A 1:1 ratio of men to women was similar to the ratios in IgA and IgG myeloma, but differed from the 3:1 ratio reported for IgD myeloma. Plasma-cell leukemia developed in 7/97 LCD patients, a higher incidence than that reported on other myelomas. The initial blood urea nitrogen was 30 mg/100 ml in 54/95 LCD patients, higher than IgA and IgG myelomas, but lower than IgD myeloma. The incidence of amyloidosis in LCD (23/97 patients) was similar to that reported for IgA and IgG myeloma, but less than the incidence in IgD myeloma. (22 references)

6350 THE ROLE OF SUPPRESSOR CELLS IN THE PATHOGENESIS OF COMMON VARIABLE HYPOGAMMAGLOBULINEMIA AND THE IMMUNODEFICIENCY ASSOCIATED WITH MYELOMA. (Eng.) Waldmann, T. A. (Metabolism Branch, NCI, NIH, Bethesda, MD 20014); Broder, S.; Krakauer, R.; MacDermott, R. P.; Durm, M.; Goldman, C.; Meade, B. *Fed Proc* 35(9): 2067-2072; 1976.

The role of suppressor cells in the pathogenesis of immunodeficiency was analyzed using the differentiation of B lymphocytes into immunoglobulin-synthesizing plasma cells. Lymphocytes from normals synthesized 4,910 ng of IgM, 1,270 ng of IgA, and 1,625 ng of IgG per 2 x 10^6 cells when cultured for 7 days in the presence of pokeweed mitogen. In contrast, the lymphocytes from patients with common variable hypogammaglobulinemia did not synthesize significant quantities of immunoglobulin. When lymphocytes from

9 of 13 patients with common variable hypogammaglobulinemia were cocultured with normal lymphocytes, immunoglobulin synthesis by the normal lymphocytes was depressed by 75%-100%. A comparable suppression by normal lymphocytes was observed when they were cocultured with T cells from hypogammaglobulinemic patients. The results suggest that in some patients common variable hypogammaglobulinemia may not be due to an intrinsic defect of B cells alone but may be caused or perpetuated by an abnormality of regulatory T cells that act to suppress B cell maturation and antibody production. Peripheral blood lymphocytes from myeloma patients also had a drastically reduced capacity to produce polyclonal immunoglobulins. Three of six myeloma patients tested had circulating mononuclear cells that suppressed immunoglobulin production by cocultured normal lymphocytes. Purified T cells from myeloma patients did not mediate this suppressor effect. This suggests that one mechanism for the humoral immune deficiency observed in myeloma patients is a block of polyclonal B cell maturation by suppressor cells. (26 references)

6351 ELECTROPHORESIS OF HUMAN MULTIPLE MYELOMA AND WALDENSTROM'S MACROGLOBULINEMIA SERA IN SODIUM DODECYL SULFATE POLYACRYLAMIDE GELS.

(Eng.) Hayes, L. C. (Dept. Pathology and Oncology, Univ. Kansas Medical Center, Coll. Health Sciences and Hosp., Kansas City, KS 66103); Plapp, F. V.; Brewer, G. J.; Rucker, M.; Moore, D.; Tilzer, L. L.; Chiga, M. *Clin Chim Acta* 66(1): 119-123; 1976.

The usefulness of the sodium dodecyl sulfate (SDS)-polyacrylamide gel electrophoresis of sera from patients with multiple myeloma and Waldenstrom's macroglobulinemia as a rapid means of classifying these monoclonal sera was probed. The method can separate clearly normal human serum proteins according to molecular wt. Sera from normal persons and patients with IgA, IgD, IgG, and IgM monoclonal gammopathies were diluted 20 times with 0.1 M sodium phosphate buffer (pH 7.2), made 1% with respect to SDS, and incubated 1 hr at room temperature. The gels were stained with Coomassie blue or they were prepared for immunodiffusion. By this method IgG multiple myeloma and IgM Waldenstrom's macroglobulinemia sera were readily distinguished by electrophoresis alone, whereas IgA and IgD myeloma sera were distinguished by further immunodiffusion against anti-α-chain and anti-δ-chain antibodies. The technique, which requires only microliters of serum, is concluded to be useful in the clinical diagnosis and study of monoclonal gammopathies and may be useful in the study of other serum protein abnormalities. Of interest are the heterogeneous polymers of IgA that were found in the multiple myeloma sera. (9 references)

6352 BINDING OF 2,4-DINITROPHENYL DERIVATIVES BY THE LIGHT CHAIN DIMER OBTAINED FROM IMMUNOGLOBULIN A PRODUCED BY MOPC-315 MOUSE MYELOMA.

(Eng.) Schechter, I. (Dept. Chemical Immunology, Weizmann Inst. Science, Rehovot, Israel); Ziv, E.; Licht, A. *Biochemistry [Washington]* 15(13): 2785-2790; 1976.

The interaction was measured of 2,4-dinitrophenyl
(DNP)-lysine with the heavy (H) and light (L)
chains of the MOPC-315 myeloma immunoglobulin A
(IgA) that binds DNP-Lys. The L chains, but not t
H chains, obtained from the IgA produced by the
MOPC-315 mouse myeloma bind the 2,4-dinitrophenyl
(DNP) group. Specific interactions with the DNP
group were determined by use of several immunoads
ents, including DNP-L-lysine-Sepharose, and eluti
of the adsorbed L chain by DNP-glycine. Equilibri
dialysis experiments showed that the M-315 L chai
in the form of a dimer (45,260 daltons) has two
identical and homogeneous binding sites that bin
DNP-L-Lys with an intrinsic association of 6.3 x
M^{-1}. This is the first report in which the L chai
binding data permit reliable determination of th
binding constant and valency of the isolated L c
and in which a predominant role for the L chain
construction of the binding site in the intact I
molecule is suggested. (36 references)

6353 IgM RECEPTORS ON THE SURFACE OF HAIRY CELLS OF LEUKAEMIC RETICULOENDOTHELIOS

(Eng.) Barker, C. R. (Dept. Haematological Medic
Univ. Cambridge Clinical Sch., Cambridge CB2 2QL
England); Burns, G. F.; Cawley, J. C.; Hayhoe, F
Lancet 1(7972): 1303; 1976.

Using an erythrocyte-antibody (EA) immunoglobuli
(IgM) rosetting test, the authors have demonstra
an IgM receptor on the surface of hairy cells fr
three cases of leukemic reticuloendotheliosis. U
4% of the mononuclear cells from normal peripher
blood also showed IgM receptors; these positive
cells had a hairy cell morphology and were capab
of phagocytosing latex particles. The detection
an EA (IgM) receptor on the hairy cells of leuke
reticuloendotheliosis and the demonstration of a
possible counterpart to these cells among the mo
nuclear cells of normal peripheral blood may be
clue to the origin and nature of hairy cells. Th
function of the EA (IgM) receptor is uncertain.
does not seem to be involved in the phagocytosis
IgM-opsonized RBC. There is a possibility that
EA (IgM) receptor represents a further phenotyp
marker characterizing an unrecognized subset of
mononuclear cells in the pathogenesis of leukem
reticuloendotheliosis and in the hematological
tion to Hodgkin's disease. (2 references)

6354 OBSERVATIONS ON IGM SERUM LEVELS IN T PATIENTS.

(Ger.) Goering, H.-D. (Medi
Akademie, DDR-501 Erfurt, Klement-Gottwald-Str.
East Germany); Schubert, H.; Raith, L. *Dermatol
Monatsschr* 161(8): 640-645; 1975.

Immunoelectrophoretic and immunodiffusion assay
were undertaken to determine the serum IgM cont
in 17 patients with various malignancies. In tw
cases each of gastric carcinoma with liver meta
and paraneoplastic skin conditions, serum IgM w
50-60 mg % and 35-45 mg %, respectively. In per
eral and central bronchial carcinoma with gener
metastases, the range was 55-80 mg %. One case
lymphocytic leukemia with generalized herpes zo

35 mg %. Levels of 65-85 mg % were found in two
tatic melanocytoblastomas, while two other
without metastasis had normal levels of 135-
ng %. The level in mycosis fungoides III was 65
while single basaliomas or spinaliomas without
tasis were within normal limits. The IgM level
rs to vary inversely with the extent of metas-
involvement. (35 references)

EFFECTS OF THYMECTOMY AND ANTITHYMOCYTE
SERUM ON SPONTANEOUS REGRESSION OF FRIEND
-INDUCED ERYTHROLEUKEMIA. (Eng.) Dietz, M.
. Biology, Michigan Cancer Foundation, 110 East
n Ave., Detroit, MI 48201); Furmanski, P.;
r, R.; Rich, M. A. *J Natl Cancer Inst* 57(1):
; 1976.

ffect of immunosuppression on the spontaneous
ssion of a leukemia induced by a specific strain
iend murine leukemia virus complex (RFV) was
ed to evaluate the role of immune response in
egression of leukemia. Thymectomy markedly
ited regression in newborns but not in adult
ed Swiss mice. Regression was markedly inhibited
ukemic mice given antithymocyte serum (ATS)
before the start of regression. During leukemia
opment, ATS treatment but not thymectomy poten-
d splenomegaly and delayed the start of regres-
Both ATS treatment and neonatal thymectomy
ased mortality as a function of the decrease in
se regression. Treatment with normal rabbit
also inhibited regression but, when given
leukemia development, affected neither the
omegalic response to RFV nor the number of
s. The data demonstrated that an intact immune
n was required for leukemia regression and
sted that some thymus-dependent parameter of
e response was a major factor in regression.
ferences)

THE ROLE OF EFFECTOR CELLS AND ANTISERUM
IN THE INHIBITION OF CELL-MEDIATED CYTO-
TY OF ALLOGENEIC TUMOR CELLS. (Eng.) Sonis, S.
pt. Surgery, Harvard Medical Sch. at Peter
Brigham Hosp., Boston, MA 02115); Stelos, P.;
erald, M. A.; Bear, S. E.; Wilson, R. E. *Trans-
tion* 22(1): 52-60; 1976.

spleen cells, obtained at specified intervals
the course of multiple immunizations of BALB/c
ith EL-4 lymphoma cells, were tested for cell-
ed toxicity (CMC) against EL-4 target cells
ated with anti-EL-4 serum from singly or re-
ly immunized animals. Cytolysis of the EL-4
was measured by a ^{51}Cr-release assay. The
s indicate that blocking of CMC in an allo-
tumor model may occur by two pathways. First,
n or antigen-antibody complexes in the immunized
may bind in vivo to the antigen receptor
of the sensitized effector cells used in the
ro CMC assay, blocking their interaction with
cells. Second, immune serum that is added to
vitro CMC assay may contain highly avid anti-
, as well as antigen-antibody complexes, that
o tumor cells and thereby block their interac-
tion with sensitized effector cells. The identification of these elements may be of prognostic value in certain clinical situations. (14 references)

6357 T AND B LYMPHOCYTES IN CHRONIC LYMPHOCYTIC LEUKEMIA (Letter to Editor). (Eng.) Hsu, C. C. (Northwestern Univ. Medical Center, Chicago, IL). *N Engl J Med* 295(9): 505; 1976.

The generation of surface immunoglobulins (Ig) by leukemic T cells has been demonstrated. Initially, only 15% of the leukemic cells were found to have surface Ig, but over the next few months, over 90% of the patient's leukemic T cells generated IgM and then IgD and other Ig determinants on the cell surface. The proportions of leukemic T cells carrying various surface Ig determinants remained relatively stable over the subsequent months. The mechanism of generation of surface Ig on the leukemic T cells is not known. Study of leukemic lymphocyte surface markers early in the disease may reveal important findings. (7 references)

6358 T AND B LYMPHOCYTES IN CHRONIC LYMPHOCYTIC LEUKEMIA. (Letter to Editor). (Eng.) Davis, S. (Veterans Administration Hosp., East Orange, NJ). *N Engl J Med* 295(9): 505; 1976.

Demonstration of the neoplastic process in T or B cell lymphocytes in chronic lymphocytic leukemia is very difficult. Karyotypic alterations in the lymphocytes may not be associated with neoplasia since chromosome aberrations are seen in various diseases and in aging processes. The problems involved in lymphocyte membrane analysis are discussed. (2 references)

6359 T AND B LYMPHOCYTES IN CHRONIC LYMPHOCYTIC LEUKEMIA. (Letter to Editor). (Eng.) Douglas, S. D. (Univ. Minnesota Medical Sch., Minnepolis, MN); Kay, N. E. *N Engl J Med* 295(9): 504-505; 1976.

The characterization of lymphocytes in chronic lymphocytic leukemia should include the sequential determination of markers for B and T cells. It is essential to assess as many lymphocyte surface markers as possible. First, the sample must be representative of the situation in vivo, the techniques employed should not select for a particular subpopulation only, and the reagents must be specific for the marker determined. Appropriate use of multiple markers for the assessment of subpopulations of B and T cells is essential for sequential long-term analysis of alterations in mononuclear-cell populations. New techniques and approaches should lead to the classification of lymphocyte subpopulations in disease. Therefore, the methods used to characterize the lymphocyte plasma membrane must be precise and standardized if these profiles are to have diagnostic and therapeutic relevance. (8 references)

6360 IN VITRO AND IN VIVO EVALUATION OF T AND B LYMPHOCYTE FUNCTIONS IN AKR MICE. (Eng.)

Collavo, D. (Inst. Pathological Anatomy, Univ. Padova, Italy); Biasi, G.; Colombatti, A.; Chieco-Bianchi, L. *Br J Cancer* 32(3): 331-338; 1975.

The mitogen response of lymphocytes of mice (AKR, CBA, and CTAT6T6 (T6)), at different ages up to and including the preleukemic period was studied. Peripheral lymphocytes, and lymph node and spleen cells were cultured. The cultures were treated with optimal amounts of phytohemagglutinin (PHA), concanavalin A (Con A), or lipopolysaccharide (LPS). For evaluation of the PHA effect by mitosis rate, the peripheral lymphocyte cultures were incubated for 72 hr at 37 C, treated with Colcemid 12 hr before harvesting, and subjected to karyotype analysis. PHA stimulation in peripheral lymphocytes of AKR and T6 cultures was indicated by uptake of ^{3}H-thymidine. For in vivo tests of responsiveness to thymus-dependent antigen, 4 x 10^8 SRBC were injected ip into mice; for responsiveness to thymus-independent antigen, 0.02 mg LPS was injected ip. The number of direct hemolytic plaque-forming cells (PFC) against SRBC was determined on days 4 and 5 following immunization; the number of direct PFC against LPS-coated SRBC was determined on days 3, 4, and 5. Blood lymphocytes from 1- or 6-mo-old AKR mice showed no significant effect of age on mitotic response to PHA stimulation in vitro. Spleen cells stimulated in vitro with Con A or PHA showed a thymidine uptake that was significantly lower than the control value. AKR and CBA cells responded similarly to LPS stimulation, indicating that AKR B lymphocytes were fully responsive. AKR mice immunized with SRBC showed less PFC than did CBA mice; a still greater difference between the two strains was observed following LPS injection. Thus, the in vivo data suggested that the immunological deficit in AKR mice involves the response to both thymus-dependent and -independent antigens. (25 references)

6361 LONG-TERM MAINTENANCE IN VITRO OF HUMAN T CELLS BY REPEATED EXPOSURE TO THE SAME STIMULATOR CELLS: DIFFERENCES WHEN USING REPEATED STIMULATION IN ALLOGENEIC MIXED LEUKOCYTE CULTURE AND WHEN USING STIMULATION WITH AUTOLOGOUS LYMPHOBLASTOID CELLS.

(Eng.) Svedmyr, E. (Dept. Tumor Biology, Karolinska Institutet, S-104 01 Stockholm 60, Sweden). *Scand J Immunol* 4(5/6): 421-427; 1975.

The autologous stimulation of lymphocytes with lymphoblastoid cell lines (LCL) was studied in restimulation experiments and also in one-way mixed leukocyte cultures (MLC) using human allogeneic lymphocytes. The lymphocytes were obtained from blood of healthy adults by centrifugation on Ficoll-Isopaque gradients. The LCL cells used were all of B-cell type, carrying the Epstein-Barr virus genome. LCL cells were treated with mitomycin when used as stimulator cells; lymphocytes were irradiated when used for this purpose. After primary culture of responder plus stimulator cells, for 2 wk, recovered viable cells were used as responders in restimulation cultures. Stimulation was indicated by ^{3}H-thymidine uptake. Cells from MLC reverted to small lymphocy after 2 wk of culture, but responded with acceler kinetics and higher thymidine incorporation on r ulation with lymphocytes of LCL cells having rel allogeneic antigens. In contrast to fresh lymphocytes, however, they did not respond to autologou LCL cells. Cultures could be restimulated every second wk with allogeneic lymphocytes and could be maintained for 4 mo. Almost all of these cult cells had the T-cell characteristic of rosette f tion with SRBC, during stimulation as well as in their reverted phase. The response to phytohemagglutinin gradually disappeared with repeated all geneic restimulation, whereas the response to the relevant lymphocytes was maintained. When fresh lymphocytes were stimulated with autologous LCL cells, the restimulation response was lower than after the primary stimulation. A low level of st tion was also achieved with allogeneic lymphocyt Further, the restimulated cultures could not be maintained by further restimulation. The results show that allogeneic stimulation of lymphocytes vitro leads to selective proliferation of T-cell with a memory capacity, whereas no long-lasting memory function is detectable following stimulat with autologous LCL cells.

6362 SPECIFIC CYTOTOXICITY IN VITRO OF LYMP CYTES SENSITIZED IN CULTURE AGAINST TU CELLS.

(Eng.) Schechter, B. (Dept. Cell Biol., mann Inst. Science, Rehovot, Israel); Treves, A. Feldman, M. *J Natl Cancer Inst* 56(5): 975-979;

The production of tumor-specific cell-mediated cytotoxicity following in vitro sensitization o C57BL spleen cells against a syngeneic 3LL Lewi lung carcinoma was studied. Lymphocytes were sen sitized on tumor cell monolayers for 4 to 5 day The cytotoxicity was assayed by measuring the r tion in ^{3}H-leucine and ^{3}H-thymidine incorporati target cells after interaction with the sensiti lympocytes. Spleen lymphocytes sensitized on 3L tumor cell monolayers caused a high extent of l these cells tested on C57BL or C3H fibroblast t gets evoked only a low level of cytotoxicity. C spleen cells sensitized on C57BL fibroblasts ca a low level of cytotoxicity when tested on a 3L target. Thus cytotoxicity appeared to be tumor cific. The reduced incorporation into protein a DNA of target tumor cells caused by the sensiti lympocytes was a measure of cell injury, which more sensitive than direct cell count or uptake ^{51}Cr. Lymphocytes from syngeneic tumor-bearing tested 13 to 25 days after tumor inoculation, d not manifest in vitro cytotoxicity. On the cont such lymphocytes sometimes appeared to have a p ing effect on the tumor cells. In some systems, enhancing lymphocytes seem to exert their activ by suppressing the host's effector activity aga the tumor. If tumor cells do divide more rapidl the presence of enhancing lymphocytes, changes the rates of protein or DNA synthesis should be recorded before changes in cell number. (21 ref ences)

3 NUCLEOLI OF LYMPHOCYTES IN THE PERIPHERAL
BLOOD OF PATIENTS WITH BRONCHOGENIC LUNG
GASTROINTESTINAL CANCER. (Eng.) Smetana, K.
st. Experimental Medicine, Czechoslovak Acad.
ences, Res. Inst. for Pharmacy and Biochemistry,
00 Praha, Czechoslovakia); Vlastiborova, A.;
ejkova, E.; Hondlik, J.; Lejnar, J.; Likovsky, Z.
plasma 23(2): 183-190; 1976.

number and morphology of lymphocytes in the
ipheral blood were studied in patients suffering
n bronchogenic and gastrointestinal cancer with
without metastases. The decreased number of lympho-
es in the peripheral blood of the patients was
to the decline of lymphocytes with ring-shaped
leoli representing resting cells that can be
mulated with respect to RNA synthesis and blastic
nsformation. The decreased number of these cells
apparently more pronounced in the peripheral
od of the patients suffering from gastrointesti-
cancer with metastases. An increased number of
phocytes with compact nucleoli or nucleoli with
leolonemas representing immature or stimulated
ls was noted in most patients suffering from
nchogenic cancer without and with metastases in
ph nodes, as well as in some patients with gastro-
estinal cancer and without metastases. On the
trary, a decreased number of these cells was
erved in the peripheral blood of patients suffer-
from gastrointestinal cancer with metastases.
these changes provide further information on the
nges of the lymphocytes in the peripheral blood
patients suffering from malignant disease. (23
erences)

INTRANUCLEAR INCLUSIONS IN PLASMA CELLS
AND LYMPHOCYTES FROM PATIENTS WITH MONOCLO-
GAMMOPATHIES. (Eng.) Brunning, R. D. (Div. Hema-
thology Dept. Lab. Medicine and Pathology, Univ.
esota Health Sciences Center, Minneapolis, MN
5); Parkin, J. *Am J Clin Pathol* 66(1): 10-21;
.

anuclear inclusions in plasma cells and lympho-
s from patients with different forms of monoclo-
gammopathies were studied ultrastructurally.
e were two distinct morphologic and ultrastructur-
ypes. In three patients, two with IgA myeloma
one with Waldenstrom's macroglobulinemia, the
usions were variably PAS-positive in routine
ions and, ultrastructurally, were composed of
tron-light amorphous material. In one patient
an IgG monoclonal gammopathy, the plasma cells
ained inclusions that were PAS-negative by light
oscopy and primarily osmiophilic by electron
oscopy. One patient with an immunoblastic sarco-
ad an IgM monoclonal gammopathy had plasma cells
numerous inclusions of both types. There was a
inct spatial relationship between the electron-
t amorphous material and the osmiophilic deposits
any of the inclusions. In cells from two patients
osmiophilic inclusions, the inclusions occurred
oth the cytoplasm and nucleus. The intranuclear
usions appeared to develop from an accumulation
aterial in the perinuclear cisterna, resulting
ingle or multiple invaginations of the nuclear
cture. (30 references)

6365 POLYMORPHONUCLEAR LEUKOCYTE, MONOCYTE, AND MACROPHAGE BACTERICIDAL FUNCTION IN PATIENTS WITH HODGKIN'S DISEASE. (Eng.) Steigbigel, R. T. (Infectious Disease Unit, Dept. Medicine, Univ. Rochester Sch. Medicine, Rochester, NY 14642); Lambert, L. H.; Remington, J. S. *J Lab Clin Med* 88(1): 54-62; 1976.

To determine if the susceptibility of patients with lymphoma, particularly Hodgkin's lymphoma, is related to an abnormality in WBC function, the serum, neutrophils, and monocytes from a group of 29 patients with all stages of untreated Hodgkin's disease and from a control group were studied simultaneously. The patients' neutrophils and serum functioned normally in the killing of *Escherichia coli*, *Staphylococcus aureus*, *Listeria monocytogenes*, and *Salmonella typhimurium*. The killing of *E. coli* and *L. monocytogenes* by the monocytes was equal to that by monocytes from the control subjects. A significantly greater number of *S. typhimurium* and *L. monocytogenes* were recovered from monocyte-derived macrophages from Hodgkin's patients than from control subjects after 1.5 hr of challenge with bacteria. This suggests that the macrophages from Hodgkin's patients may be more avidly phagocytic than normal macrophages. (62 references)

6366 PROGRESSIVE LOSS OF IN VITRO IMMUNE RESPONSE WITH TUMOR GROWTH. (Eng.) Schumm, D. E. (Dept. Physiological Chemistry, Ohio State Univ. Coll. Medicine, Columbus, OH 43210); Billmire, D. F. *Cell Immunol* 24(2): 348-354; 1976.

Peripheral blood lymphocytes from male Buffalo or Sprague-Dawley rats carrying a transplantable hepatoma were cultured in the presence of phytohemagglutinin (PHA), concanavalin A (Con A), or dextran sulfate (DS) at various times after tumor cell inoculation or after its surgical removal. Mitogen-induced lymphocyte transformation, measured by ^{3}H-thymidine incorporation, declined as the tumor size increased, especially when cells were cultured in autologous serum. The response to PHA and Con A declined prior to the response to DS. This inhibition could not be removed by extensive washing of the cells, alteration of serum concentration, time of incubation, or mitogen dose. Culture for 24 hr prior to the addition of high doses of mitogen resulted in partial restoration of the PHA and Con A, but not DS, responses. Previously inhibited responses also returned when the tumor was removed surgically. Spleen cells from animals with large tumors were also inhibited. The data suggest a model in which the tumor produces a factor that, when interacting with circulating lymphocytes, alters the membrane of these cells, which prevents even the earliest of mitogen-induced biochemical events from occurring. (20 references)

6367 ROLE OF THE REGIONAL LYMPH NODE IN NEOPLASIA: CELLULAR MEDIATED REACTIVITY IN VITRO BY AUTOLOGOUS REGIONAL OR DISTANT LYMPH NODES OR PERIPHERAL BLOOD LYMPHOCYTES OF DOGS WITH SPONTANEOUS NEOPLASMS. (Eng.) Fidler, I. J. (Sch. Dental Medicine and Medicine, Univ. Pennsylvania, Philadelphia, PA 19174); McWilliams, R. W.; Bech-Nielsen, S.; Budmen, M. B. *Immunol Commun* 4(4): 325-335; 1975.

The cell mediated responses (CMR) in vitro to spontaneous canine tumors were studied using lymphocytes from regional lymph nodes (RLN), distant nodes (DLN), and peripheral blood lymphocytes (PBL). The tumors used were three fibrosarcomas, one adenocarcinoma, one melanoma and one osteosarcoma. Tumor tissue, RLN, DLN, PBL, and sera were collected prior to necropsy. Cells not adhering within 4 hr were discarded, and adherent cells after 24 hr further culture were used as target cells. For in vitro tests on inhibition of tumor growth, tumor cells at 1,500 cells/ml culture medium and lymphocytes at 100-fold or 1,000-fold this concentration were incubated. Cultures of tumor cells not containing lymphocytes were used as controls. The results of the tests were similar regardless of the source of lymphocytes used. Inhibition of tumor cell growth was observed with the high ratio of lymphocyte to tumor cells of 1,000:1 but not with the low ratio of 100:1. When target cells were first incubated with autologous serum and lymphocytes were then added to the cultures, the serum was said to block CMR in certain tests. The results suggest that in advanced stages of spontaneous neoplasia, RLN lymphocytes are not unique in their response to autochthonous tumors and that RLN can therefore be removed without compromising the patient's defense mechanism. (18 references)

6368 RESPONSIVENESS OF LYMPHOID PRECURSORS TO POLYCLONAL B-CELL ACTIVATORS. (Eng.) Gronowicz, E. (Div. Immunobiology, Karolinska Inst., Wallenberglaboratory, Lilla Frescati, S-104 05 Stockholm 50, Sweden); Coutinho, A. *Scand J Immunol* 4 (5/6): 429-437; 1975.

The possible role of accessory cells in the response of B cells and their precursors to polyclonal B-cell activators (PBA) was studied. Fetal liver cells were obtained from fetuses of normal B10.5M mice on the 13-16th days of gestation; bone marrow cells were obtained from hind legs of adult mice; peritoneal cells were obtained from adult mice. The PBAs used were lipopolysaccharide from *Escherichia coli* (LPS), purified protein derivative from tuberculin (PPD), and dextran-sulfate (DxS). DNA synthesis was measured by uptake of ^{3}H-thymidine. Spleen cells responded with increased DNA synthesis to all PBAs tested; fetal liver cells and bone marrow cells responded well only to DxS. Depletion of adherent cells present in the fetal liver cultures caused a small decrease in the response of the cells to DxS, and addition of normal peritoneal cells containing a high percentage of mature macrophages failed to restore the response. This lack of response to LPS and PPD was not changed by depletion of adherent cells or addition of peritoneal cells. Thus the response of the fetal liver and bone marrow cells was not dependent on adherent cells and the lack of LPS and PPD responses could not be ascribed to the presence of inhibitory cells. LPS inhibited the DxS response of fetal liver cells, suggesting that DxS-responsive cells are precursors
to B cells. This interpretation was supported by t
finding that bone marrow cells became responsive t
LPS after DxS stimulation. Further, bone marrow
cells, sequentially stimulated with DxS and LPS,
contained increased surface Ig. The data indicate
that DxS increases the rate of differentiation of
B-cell precursors. The previously demonstrated se
tial gain of responsiveness of B cells to DxS, LP
and PPD during maturation of the cells is not due
lack of accessory cells during early stages in th
maturation. (18 references)

6369 INHIBITORY TUMOR FACTORS. BEHAVIOR OF
FETAL B-LYMPHOCYTES AND MACROPHAGES DUR
CANCEROGENESIS. (Eng.) Garotta, G.; Porta, C. *In:*
Molecular Base of Malignancy. New Clinical and Th
peutic Evidence. Deutsch, E.; Moser, K.; Rainer,
Stacher, A., eds. (Stuttgart: Georg Thieme Publis
ers): pp. 113-119; 1976.

Information on the mechanisms of immunodepression
by Ehrlich ascites tumor (AT) cells was gained by
studying the soluble tumor factor effects on the
maturation of B-lymphocytes and macrophages of th
fetus of tumor-bearing mice. Female Swiss mice we
mated and injected ip with 2 x 10^7 AT cells at 7,
11 and 13 days of gestation. Tumor-bearing and no
mal pregnant mice were sacrificed at 14, 16, and
days of gestation and the fetuses excised. Liver
spleen cell suspensions from these fetuses and fr
1-day to 12-wk-old mice delivered by tumor-beari
mothers were prepared. Rosette-forming cells wer
counted by hemocytometer in 0.15 ml of liver or
spleen suspension mixed at room temperature with
equal volume of indicator, centrifuged at 120 x
for 5 min, and resuspended. Counts performed wit
and without addition of Na_3HEDTA represented B-l
phocytes alone or B-lymphocytes plus macrophages
respectively. From 14 days of gestation to birth
normal liver B cells increased from 0.33% to 2.0
livers of fetuses from AT-bearing mothers contai
a significantly lower percentage, 0.40% to 0.20%
Normal spleens contained 0.50% to 0.70% of B-lym
cytes from 18 days of gestation to birth, while
spleens from fetuses with tumor-bearing mothers
contained 0.0002% to 0.20%. No B cell difference
were noted in mice born to normal or cancerous m
ers. Normal liver macrophages increased from 1.5
to 16%, 14 days to birth. Liver macrophages of f
tuses from cancerous mothers showed a rate of in
crease comparable to controls. Fetal spleen macr
phages were unaffected by AT cells. Following de
ery, the number of liver macrophages of mice bor
cancerous mothers was significantly higher than
normal during the first week of life (21.00% vs
6.5%); spleen macrophages behaved similarly. Mat
neoplasia changed the cellular composition of th
liver from 18 days to birth and tapered off to n
mality within 2 wk after birth; similar results
obtained from spleen cells. The results support
previous findings that AT cells produce a solubl
factor, hypothesized to be a transplacental anti
which interferes with the hemolymphopoietic syst
and immune responses. (25 references)

MACROPHAGE MEMBRANE POTENTIAL TEST: AN
ELECTROPHYSIOLOGICAL MODIFICATION OF THE
-CASPARY TEST IN MELANOMA PATIENTS. (Ger.)

n, K. (Institut fuer Physiologie, Medizinische
ie Magdeburg, 30 Magdeburg, East Germany);
, H. *Acta Biol Med Ger* 34(11/12): 1911-1914;

cytes harvested from venous blood form immuno-
lly active complexes (lymphokines) on iv incuba-
ith an antigen against which they are sensit-
Human encephalitogenic protein served as the
n; lymphocytes were drawn from 35 patients
istologically confirmed malignant pigment
of the skin (e.g., melanoma) and other cutane-
mors (e.g., foreign body granuloma). The cell-
upernate of the complex (lymphokine) was ap-
to guinea pig peritoneal exudate macrophages.
anoma or Dubreuilh's disease with prodromal
ancy the macrophage membrane became 10%-40%
olarized. In nevus cell nevi and spinalioma
etastases, polarization increased 12%. Antigen
elicited slight hyperpolarization, as did
ic contact eczema. It follows that incipient
cyte sensitization induces incipient hyper-
zation. In BCG-injected patients there was an
l slight hyperpolarization leading to strong
rization after several weeks, possibly due to
tion of lymphocyte activity by blocking anti-
The transmembrane potential in healthy persons
ients with benign conditions remained unchanged;
avior is a more sensitive index than cyto-
try. (17 references)

THE LASAT MOUSE: A NEW MODEL FOR TRANSPLAN-
TATION OF HUMAN TISSUES.

(Eng.) Lozzio, B.
perimental Hematology Lab., Univ. Tennessee
al Res. Center, Center for Health Sciences,
coa Highway, Knoxville, TN 37920). *Biomedicine*
144-147; 1976.

sat mouse, a new animal model, was developed
eding congenitally athymic with hereditarily
c mice. The new hybrids have no cellular
y and produce significantly less antibody
de mice. The lasat mouse is useful for the
antation of normal and malignant hemopoietic
nd other neoplastic tissues of human origin.
erences)

TRANSPLANTATION STUDIES. PART B.

(Eng.)
Gellatly, J. B. *In: Mouse Hepatic Neoplasia.*
ings of a Workshop held at the H.T.S. Manage-
ntre, Lane End, High Wycombe (Great Britain),
ay 1974. Butler, W. H.; Newberne, P. M., eds.
rk: Elsevier Scientific Publishing Co.): pp.
; 1975.

rarenal transplantation of hepatic parenchymal
was investigated in C57BL mice in a two-part
(a) the recipient mice were killed after 6-10
ssess the viability and growth potential of
tissue from parenchymal nodules; and (b)
nts were allowed to survive for 1 yr from
receipt of transplants. Portions of 11 nodules were transplanted into 45 recipient mice; 24 isografts were found to be viable 6-10 wk after implantation. In the second study, 11 lesions were transplanted into 64 recipients. Laparotomy at 3 mo revealed intrarenal foci in 16 recipients of tissue from donor hepatic nodules. During the next 9 mo, 12/64 recipients died; the remaining 52 were killed 1 yr after the initial transplant operation. Isograft growth developed in 17/64 recipients from five donor nodules. Isografts from a donor nodule (No. 1536) containing areas resembling a poorly differentiated hepatoblastoma grew rapidly and had the malignant characteristics of renal invasion, poor differentiation, and transcoelomic metastases. The sex of the recipients influenced the establishment of transplants: 14/17 established transplants occurred in recipients of the same sex as the donor. Histological studies revealed a variable degree of similarity between the morphology of the donor nodule and that of the isografts. In two cases, the dominant morphological features of the original nodule were closely replicated. In one of these (1536), both donor nodule and recipient isografts demonstrated a poorly differentiated hepatocellular carcinoma that, in the recipient, invaded the kidney and metastasized widely through the abdomen. It is concluded that a proportion of spontaneous hepatic parenchymal nodules in C57BL mice were transplantable, with most established isografts growing slowly by expansion but some capable of rapid growth with tissue invasion and metastases. (16 references)

6373 RECOGNITION AND REJECTION OF METHYLCHOLANTHRENE INDUCED SARCOMA IMPLANTS IN BONE.

(Eng.) Boak, J. L. (Dept. Surgery, Royal Postgraduate Medical Sch., Hammersmith Hosp., Du Cane Road, London, W12, England); Stolier, A. J.; Cooke, T. J. *Bull Soc Int Chir* 34; 457-460; 1976.

The recognition of secondary antigenic tumors in bone by CBA syngeneic male mice immunized against the tumor was studied. A murine sarcoma, induced by injecting methylcholanthrene into 1-mo-old mice, was transplanted into the femoral condyles. These mice were challenged at a later date with an sc injection of viable sarcoma cells. The sensitized mice developed significantly fewer tumor than the controls when both were challenged with the sarcoma cells. Mice challenged with a viable sarcoma plug into a femoral condyle also developed fewer tumors than controls. These results indicate that tumors, characterized by tumor-specific antigens, implanted into a femoral condyle can sensitize the host against those antigens; also, the tumors will be rejected if implanted into this site in a sensitized host. Care was taken to insure that the plugs used to sensitize or challenge the host were implanted in cancellous bone of the condyle and not into the bone marrow of the shaft. The marrow contains immunologically competent cells and would be expected to recognize and respond to the tumor insult. Further studies are necessary to determine whether immunological mechanisms can influence tumors already established and growing as deposits in bone. (7 references)

6374 HUMAN BREAST CANCER SERIALLY TRANSPLANTABLE IN NUDE MICE IN ASCITES FORM.

(Eng.) Hirohashi, S. (Dept. Pathology, Keio Univ. Medical Sch., Japan); Shimosato, Y.; Nagai, K.; Koide, T.; Kameya, T. *Gann* 67(3): 431-436; 1976.

A cell suspension of a human breast cancer cell line (Hattori line was injected ip into male and female athymic nude mice (BALB/c nu/nu 4-8 wk old) to produce ascites-form breast cancer (peritoneal carcinomatosis). Subsequent serial transfers of cancer cells in ascites were also successful. All the mice injected with 1 x 10^7 tumor cells died of accumulation of ascitic fluid after a latent period averaging 4 wk, except one, which died of a wasting disease. Multiple lung metastases were observed in some mice. The tumor cells retained the cytological characteristics of the original cell line, and the histology of the infiltrating tumor in the peritoneum and omentum was that of a poorly differentiated adenocarcinoma. Differentiation not only toward acinar or duct lining cells but also toward myoepithelial cells was observed by histochemistry, immunohistochemistry, and electron microscopy. (11 references)

6375 TRANSPLANTATION OF HUMAN TUMORS IN NUDE MICE.

(Eng.) Shimosato, Y. (Pathology Div., Natl. Cancer Center Res. Inst., 5-1-1, Tsukiji, Chuo-ku, Tokyo 104, Japan); Kameya, T.; Nagai, K.; Hirohashi, S.; Koide, T.; Hayashi, H.; Nomura, T. *J Natl Cancer Inst* 56(6): 1251-1260; 1976.

Ninety-one human tumors, including various common carcinomas, low-grade malignant tumors, and benign tumors, were transplanted into athymic nude mice. Tumor take was confirmed histologically for 22 neoplasms at the initial transplantation, and 14 serially transplantable tumors were established including some hitherto unestablished or unreported, such as lung and hepatic cell carcinomas. Among the 91 tumors were 21, 14, and 13 carcinomas of the lung, stomach, and breast, respectively. Transplantability was highest in lung carcinomas (10/21), followed by gastric carcinomas (2/14) and breast carcinomas (1/13). Morphology of original tumors was retained well in most transplanted tumors, but desmoplastic or scirrhous tumors, such as gastric and breast carcinomas, tended to become medullary with a decrease in amount of tumor stroma. The ability to produce mucin in gastric carcinomas or melanin in malignant melanoma was maintained in serially transplantable tumors. In addition, ectopic production of adrenocorticotropin and beta melanocyte-stimulating hormone continued in a transplanted small cell carcinoma of the lung. Preliminary results were obtained on hormone dependency of the transplantable breast carcinoma and on α_1-fetoprotein in the transplantable hepatic cell carcinoma. (26 references)

6376 A STUDY OF HUMAN TUMOURS GROWING IN NUDE MICE.

(Eng.) Povlsen, C. O. (Pathological Anatomical Inst., Kommunehospitalet, Cophenhagen, Denmark). *Adv Tumor Prev Detect Charact* 3: 127-131; 1976.

Congenitally athymic nude mice have been used to
study human tumor transplantation and to test the
sensitivity of human tumors to various chemotherapeutic agents. Various types of human tumors were
transplanted directly into nude mice of BALB/c bac
ground. The transplanted tumors grew locally at th
implantation site, and metastatic spreading to lym
nodes or organs was never observed. The human natu
of the mouse-grown tumors was preserved, as judged
from microscopic examination, chromosome analyses,
and isozyme studies and by the demonstration of
anti-human antibodies in the sera of tumor-bearing
mice. Preliminary data on various chemotherapeutic
agents show a pattern of drug susceptibility that
accords with experience from clinical practice. Th
system may offer a new in vivo model for testing t
sensitivity of individual human tumors to various
chemotherapeutic agents. (20 references)

6377 NONIMMUNE AND IMMUNE SURVEILLANCE. I. GROWTH OF TUMORS AND NORMAL FETAL TISSUE GRAFTED INTO NEWBORN MICE.

(Eng.) Zinzar, S. N.
(Lab. Virology, Oncological Scientific Center, Aca
Medical Sciences USSR, Moscow 115478, USSR); Svet-
Moldavsky, G. J.; Karmanova, N. V. *J Natl Cancer*
Inst 57(1): 47-55; 1976.

The growth of various fetal tissues and transplant
able tumors in syngeneic newborn and adult mice
[BALB/c, DBA/2, and (CBA x C57BL/6J)F_1] was compar
Fetal skin, a mixture of all fetal tissues, and
tumors were transplanted. The tumors arose spontan
ously (hepatomas, mammary gland adenocarcinoma,
MGAC) or resulted from the malignant conversion of
ectopic transplants either of fetal tissues (urina
bladder carcinoma, adenocarcinoma of small intesti
stomach sarcoma) or of adult animal tissues (ovari
carcinoma) in the syngeneic system. The growth of
fetal skin transplants and teratomas, which develo
after transplantation of minced tissue from 18- to
20-day and 12- to 14-day fetuses, was considerably
inferior in newborn syngeneic recipients, compared
with similar transplants in adults. Inhibition of
tumor growth observed in newborn animals was manifested in prolongation of the latent period before
tumor node appearance and in slowing of the growth
rate of developed tumors. One of six tumors studie
(MGAC) grew at the same rate in newborn and adult
recipients. It is suggested that a special type o
cellular and/or humoral mechanisms controlling tu
growth exists in newborns. The activity of such
factors may be based on fetal tumor antigens as
targets. (56 references)

6378 INFLUENCE OF BCG VACCINATION IN THE PRIMARY AND TRANSPLANTABLE HAMSTER TUMORS INDUCED BY SV40 AND ON THE SPECIFIC SV40 VIRUS-INDUCED ANTITUMOR IMMUNITY.

(Eng.) Zhalgasbayeva,
T. (Inst. Experimental and Clinical Oncology, Aca
Medical Sciences USSR, 115478 Moscow, USSR). *Neop*
ma 23(2): 129-136; 1976.

The effect of BCG vaccination and BCG in combination with specific immunization with simian virus
(SV40) on the incidence and growth of transplanta

induced tumors in Syrian hamsters was studied.
rent BCG vaccine preparations containing 60-100
ons of viable mycobacteria/mg were used. One
wo id injections of BCG (0.25 mg/animal) during
atent period in newborn hamsters inoculated
SV40 had no effect on the incidence of primary
induced tumors. Repeated injections of BCG
during the latent period increased the frequen-
tumors in one of two experiments. Different
rations of BCG varied in their capacity to
ase nonspecific antitumor resistance; some
rations were nonimmunogeneic. Injections of a
re of BCG and SV40 as well as BCG followed with
14 and 20 days later did not lead to additive
ts of immunization, even when immunogenic pre-
ions of BCG were used. Moreover, inoculation of
followed by BCG injection 7, 14, or 20 days
completely or partly diminished the effect of
specific immunization. (19 references)

THE BEHAVIOR OF SKIN GRAFTS INCOMPATIBLE WITH RESPECT TO SKIN ALLOANTIGENS ON MICE
RED TOLERANT AT BIRTH WITH LYMPHOID CELLS.
) Silvers, W. K. (Immunobiology Res. Unit,
Human Genetics and Pathology, Univ. Pennsyl-
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ISOLATION AND STRUCTURE OF PRODUCTS OF THE HUMAN HISTOCOMPATIBILITY GENE COMPLEX.
) Strominger, J. L.; Chess, L.; Humphreys, R.
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ger, T.; Terhorst, C. *In: The Role of Products*
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Academic Press, Inc.): pp. 621-645: 1976.

TUMOR-ASSOCIATED ANTIGENS IN HUMAN MYELOMA.
(Eng.) Krueger, R. G. (Christ Hosp. Inst.
al Res., 2141 Auburn Ave., Cincinnati, OH 45219);
ck, L. D.; Boehlecke, J. M. *J Natl Cancer Inst*
: 711-715; 1976.

ANTI-DNA ANTIBODIES IN PATIENTS WITH LEUKEMIA AND LYMPHOMA. (Eng.) Izui, S. (WHO
ology Research and Training Centre, Centre de
fusion, Hopital cantonal, CH-1211 Geneva, Swit-
nd); Lambert, P. H., Carpentier, N. A.; Miescher,
Schweiz Med Wochenschr 106(40): 1377-1378;

THE ABSENCE OF B-CELL ANTIGEN B2 FROM LEUKAEMIA CELLS AND LYMPHOBLASTOID CELL
. (Eng.) Billing, R. J. (Dept. Surgery, Sch.
ine, Univ. California, Los Angeles, CA 90024);
, R.; Terasaki, P. I.: Peterson, P. *Lancet*
): 1365-1367; 1976.

6384 INHIBITION OF NORMAL ALLOGENIC LYMPHOCYTE MITOGENESIS BY A SOLUBLE INHIBITOR EXTRACTED FROM HUMAN COLONIC CARCINOMA. (Eng.) Remacle-Bonnet, M. M. (U. E. R. de Medecine, Laboratoire d'Immunologie, 27, Boulevard Jean Moulin, 13385, Marseille, Cedex 4, France); Pommier, G. J.; Kaplanski, S.; Rance, R. J.; Depieds, R. C. *J Immunol* 117(4): 1145-1151; 1976.

6385 LYMPHOCYTE PLASMA MEMBRANES. VI. SURFACE ANTIGENS OF LYMPHOCYTES IN CHRONIC LYMPHOCYTIC LEUKEMIA. (Eng.) Zimmerman, B. (Hosp. Sick Children, Toronto, Ontario, Canada); Chapman, M. L. *J Natl Cancer Inst* 56(4): 725-729; 1976.

6386 CELLULAR IMMUNE REACTION TO HUMAN MALIGNANT MELANOMA AND BREAST CARCINOMA CELLS. (Eng.) Canevari, S. (Istituto Nazionale per lo Studio e la Cura dei Tumori, Via G. Venezian 1, 20133 Milan, Italy); Fossati, G.; Della Porta, G. *J Natl Cancer Inst* 56(4): 705-709; 1976.

6387 THE ROLE OF THE THYMUS AND THYMIC HUMORAL FACTORS IN IMMUNOTHERAPY OF APLASTIC AND PROLIFERATIVE DISEASES OF THE HEMOPOIETIC SYSTEM. (Eng.) Aleksandrowicz, J. (Hematological Clinic, Inst. Internal Medicine, Medical Acad., Cracow, Poland); Skotinick, A. B. *Acta Med Pol* 17(1): 1-18; 1976.

6388 IMMUNOSTIMULATION OF HIGHLY IMMUNOGENIC TARGET TUMOR CELLS BY LYMPHOID CELLS IN VITRO. (Eng.) Prehn, L. M. (Fox Chase Cancer Center, Philadelphia, PA 19111). *J Natl Cancer Inst* 56(4): 833-838; 1976.

6389 B LYMPHOCYTES IN PRIMARY AND SECONDARY DEFICIENCIES OF HUMORAL IMMUNITY. (Eng.) Gajl-Peczalska, K. (Univ. Minnesota Hosp., Minneapolis, MN); Lim, S. D.; Good, R. A. *Birth Defects* 11(1): 33-35, 1975.

6390 T AND B LYMPHOCYTES IN CHRONIC LYMPHOCYTIC LEUKEMIA (Letter to Editor). (Eng.) Nowell, P. (Univ. Pennsylvania Medical Sch., Philadelphia, PA); Daniele, R.; Rowlands, D.; Winger, L. *N Engl J Med* 295(9): 504; 1976.

6391 CELLULAR LOCALIZATION OF IMMUNOGLOBULIN WITHIN HUMAN MALIGNANT MELANOMATA. (Eng.) Lewis, M. G. (McGill Univ. Cancer Res. Unit, 3655 Drummond St., Montreal, Canada); Proctor, J. W.; Thomson, D. M.; Rowden, G.; Phillips, T. M. *Br J Cancer* 33(3): 260-266; 1976.

6392 INHIBITION OF MACROPHAGE MIGRATION BY PLASMA FACTOR(S) FROM PATIENTS WITH NEOPLASMS AND NORMAL INDIVIDUALS. (Eng.) Bice, D. E. (Inhalation Toxicology Res. Inst., Lovelace Foundation, P.O. Box 5890, Albuquerque, NM 87115); Gruwell, D.; Salvaggio, J. *J Reticuloendothel Soc* 19(5): 281-289; 1976.

6393 BRIEF COMMUNICATION: TUMOR-SPECIFIC IMMUNOGENICITY INDUCED BY CHEMICAL MODIFICATION. (Eng.) Eggers, A. E. (Natl. Cancer Inst., Natl. Insts. Health, Public Health Service, U. S. Dept. Health, Education, Welfare, Bethesda, MD 20014). *J Natl Cancer Inst* 56(4): 869-870; 1976.

See also:

* (Rev): 6015, 6016, 6024, 6025, 6026, 6027,
6028, 6030, 6088, 6089, 6090, 6091,
6092, 6093, 6094, 6095, 6096, 6097
6098, 6106, 6125, 6126
* (Chem): 6166, 6167
* (Phys): 6564
* (Viral): 6278, 6282, 6292, 6297, 6303, 63
6315, 6319, 6321, 6327, 6328, 63
6331, 6332, 6340
* (Path): 6395, 6411, 6412, 6413, 6448
* (Epid-Biom): 6520

94 PLASMA VITAMIN A IN PATIENTS WITH BRONCHIAL CARCINOMA. (Eng.) Basu, T. K. (Dept. Bio-
emistry, Univ. Surrey, Guildford, Surrey); Donald-
ı, D.; Jenner, M.; Williams, D. C.; Sakula, A. *Br
Cancer* 33(1): 119-121; 1976.

asma vitamin A levels were investigated in 28
tients (mean age 67 yr, all smokers) who had been
agnosed by chest x-ray, bronchoscopy, bronchial
opsy, and sputum cytology as having bronchial
rcinoma. The mean plasma vitamin A level in this
oup was 45.6 μg/100 ml (range 20.2-79.5 μg/100 ml)
mpared with a control group of 10 healthy subjects
ean age 58 yr) who exhibited a mean level of 68.4
/100 ml (range 43.6-80.8 μg/100 ml). When the
tients with bronchial carcinoma were divided into
ree groups according to their histological diag-
sis, patients with large cell undifferentiated
rcinoma showed vitamin A levels comparable to the
ɔ control groups (mean 65.1 μg/100 ml). However,
tients with squamous cell carcinoma showed a sig-
ficantly lower plasma vitamin A level (mean 39.6
/100 ml), as did patients with oat cell carcinoma
ean 36.3 μg/100 ml). Plasma vitamin A levels in
tients with bronchial carcinoma thus appear to
ry with the histological type of the tumor. (7
ferences)

95 MULTIPLE NEOPLASMS IN A CASE OF PROGRESSIVE RHEUMATOID ARTHRITIS TREATED WITH
ATHIOPRINE. (Ger.) Neuhaus, K. (I. Med. Klinik,
ntonsspital, 400 Basel, Switzerland); Thorhorst,
; Bertel, O.; Speck, B. *Praxis* 65(8): 213-221;
76.

54-yr-old chemical worker with severe and progres-
ve rheumatoid arthritis of long standing presented
th a bronchial carcinoma of the right upper lobe
l subsequently with cheek basalioma and carcinoma
the lower lip, all of which were surgically trac-
ble. Reticulum-cell sarcomas of liver, spleen, and
ain were found at autopsy. The onset of these
mors occurred approx 6 yr after immunosuppressive
nagement of the rheumatoid arthritis with azathi-
rine and steroids, which followed earlier therapy
th gold salts and Butazolidin. Various hypotheses
rrelating immunosuppression and oncogenesis are
viewed. (10 references)

96 MALIGNANT TRANSFORMATION FOLLOWING A SINGLE TRAUMA. (Slo.) Halmos, J. (Katedra chirur-
ckei a zachovnej stomatologie Lek. fakulty Univer-
ty Komenskeho, Bratislava, Czechoslovakia). *Bratisl
k Listy* 63(6): 713-716; 1975.

though there is some controversy over the pos-
bility of malignant transformation following a
ngle trauma, it is confirmed by statistics from
e postwar period in a small percentage of cases,
ur of which are described. In a 55-yr-old male
rm worker, a tumor developed within a year follow-
g a blow from a cow's horn to the right side of
s face. Radical surgery revealed an object similar
a piece of horn in the tumor, which was identified
a flat cell carcinoma. X-ray examination re-
aled a tumor in a 45-yr-old woman 4 yr after she had received a blow by a fist in the left suborbital region. Extirpation of the nervus infraorbitalis was followed by a histological diagnosis of neurofibroma, and a tumor subsequently removed from the retrobulbar region was diagnosed as a neurofibrosarcoma. A 70-yr-old man had a fistula in the region of the left maxilla since being wounded 20 yr previously. Radical surgical removal of the tumor, diagnosed as a prickle cell carcinoma, revealed a piece of shrapnel. Finally, a 59-yr-old woman, 2 yr after injury to the os zygomaticum, developed a tumor that was identified as a fibrosarcoma after surgical removal. In all the above cases the tumors were primary, and no other tumorous lesions were found during surgery.

6397 THE VASCULARIZATION OF TUMORS. (Eng.) Folkman, J. (No affiliation given). *Sci Am* 234(5): 58-73; 1976.

The vascularization of solid tumors in vivo is reviewed. The vascularization of an in situ lesion, which converts it to a growing malignancy, is triggered when the tumor cells release a diffusable chemical substance called tumor angiogenesis factor (TAF). When cells in the endothelium of capillary blood vessels were exposed to TAF, they began synthesizing DNA within 10 hr, and the proliferation of endothelial cells was observed within 48 hr. Tumor-induced vascularization is a distinct phenomenon, unaccompanied by inflammation, and neither necrotic nor killed tumor is capable of releasing TAF or stimulating neovascularization. The three-dimensional configuration of an avascular tumor is the key to its dormancy, the surface area becoming too small for nutrients to diffuse into the central region and for wastes to diffuse out of it. TAF appears to be released independently of the rate of division of tumor cells. A diffusible factor that has an inhibitory effect on the tumor-induced proliferation of capillaries was recently isolated from cartilage. TAF has not been found in a normal adult or embryonic animal or human tissues, although the capacity to induce angiogenesis may be an early event in the stepwise transformation of normal cells to the fully malignant state. Rapid tumor growth alone does not explain the increasing malignancy of advanced cancers, and there is some evidence to link angiogenesis with both invasiveness and metastasis. Neovascularization also seems to be important in some diseases other than cancer, e.g., diabetes, trachoma, and rheumatoid arthritis. Further investigation into the nature of vascular proliferation itself is required. (No references)

6398 THE REACTION OF BLOOD VESSELS TO TUMOUR INVASION. (Eng.) Iyengar, B. (Dept. Pathology, Maulana Azad Medical Coll., New Delhi, India); Chandra, K. *Indian J Cancer* 13(1): 9-14; 1976.

Changes produced by the infiltration of tumor cells into medium-sized blood vessels were observed in 45 carcinoma specimens from total breast mastectomies. Multiple paraffin sections 5 μm thick from the tumor-bearing area and surrounding tissue were stained to delineate the blood vessel wall. Twenty carcinoma breasts showed evidence of blood vessel invasion and vascular changes of varying severity, including Monckeberg's medial calcification, necrosis of the walls, and endothelial proliferation and fibrosis. Vascular invasion by the tumor cells was governed by the nature of the tumor: (a) more-differentiated tumors elicited a severe necrotizing reaction that did not allow entry of tumor cells into the blood vessel; (b) the less-differentiated ones induced a proliferation of the endothelium, ranging from rapid closure of the lumen, which strangulated the tumor cells, to a slower proliferation with passage of tumor cells into the vessels, and (c) anaplastic tumors produced no response. Two important findings are that evidence of vascular reaction within a tumor may indicate invasion and that prognosis may depend on the type of vascular response. (7 references)

6399 THE CARCINOID ENDOCARDIAL PLAQUE: AN ULTRASTRUCTURAL STUDY. (Eng.) Ferrans, V. J. (Section Pathology, Natl. Heart Lung Inst., Natl. Insts. Health, Bethesda, MD 20014); Roberts, W. C. *Hum Pathol* 7(4): 387-409; 1976.

The findings of light and electron microscopic studies of carcinoid plaques in three patients with the carcinoid syndrome are presented. The site of the primary tumor in all three was the ileum, and the duration of illness was 9, 2 and 1 yr. Ultrastructural studies disclosed that the plaquelike endocardial thickenings (2 mm) in the patients were composed of smooth muscle cells embedded in a stroma that was rich in acid mucopolysaccharides, collagen, and microfibrils, but devoid of elastic fibers. The smooth muscle cells contained variable numbers of myofilaments and cisterns of rough-surfaced endoplasmic reticulum, and their basement membranes were greatly thickened, reduplicated, and arranged in layers. The endocardial plaques appeared similar histologically and ultrastructurally, regardless of their location in the heart. The smooth muscle cells in these plaques appear to have been derived from primitive mesenchymal cells, which normally are present in the subendocardial endothelial space. It is postulated that these plaques develop as a result of healing of repeated bouts of endothelial cell injury, with a resultant increase in the permeability of the enodthelial barrier, and that this damage is aggravated in regions of turbulent blood flow, accounting for plaque formation in such areas. Although both serotonin and bradykinin are capable of such endothelial damage, the evidence suggests that plaques result from the release of bradykinin from the hepatic metastases of a carcinoid tumor. (59 references)

6400 APOPTOSIS IN LICHEN PLANUS AND SEVERAL OTHER DERMATOSES. INTRA-EPIDERMAL CELL DEATH WITH FILAMENTOUS DEGENERATION. (Eng.) Hashimoto, K. (Memphis Veterans Administration Hosp., 1030 Jefferson Ave., Memphis, TN 38104). *Acta Derm Venereol (Stockh)* 56(3): 187-210; 1976.

Eosinophilic bodies (Civatte bodies) were studied by light and electron microscopy in biopsy specimens
from a case of lichen planus and from 10 cases of
lichenoid and 2 cases of myeloma-associated amylo
oses, 2 cases of nevoid basal cell epithelioma sy
drome, 1 case of balloon cell nervus, 7 cases of
actinic keratisis and 1 case of squamous cell car
cinoma grade II. The cells commonly contained who
of distinct filaments (60-80 A), which could be
attached to desmosomes. Unlike keratinized cells,
the cellular envelope was not thickened by the fo
tion of the marginal band. The cytoplasm containe
large number of vacuoles, the nucleus was lost by
condensation or diffuse disintegration. Finally,
cells could be dropped into the upper dermis and
filamentous contents could be released to dermal
phagocytes. It is concluded that Civatte bodies a
other eosinophilic bodies of neoplastic and hyper
plastic epidermis represent filamentous degenerat
or premature keratinization of keratinocytes. (3
references)

6401 FABRY'S DISEASE: HETEROZYGOTE DETECTIO
HAIR ROOT ANALYSIS. (Eng.) Grimm, T. [
tut fuer Haemangenetic der Universitaet Freiburg
gau)]; Wienker, T. F.; Ropers, H. H. *Hum Genet* 3
329-334; 1976.

Various problems involved in identifying inborn
errors of metabolism in heterozygotes using enzy
analysis are discussed. Since most hair roots of
heterozygotes express only one of both alleles,
cells can be analyzed enzymatically for the erro
These techniques were used to examine a large fa
with Fabry's disease (angiokeratoma corporis dif
including 8 obligatorily heterozygous sisters an
their 15 children. α-Galactosidase activity and
protein contents were determined in several root
from each patient. Data presented suggests a cor
tion between α-galactosidase in WBC and hair roo
of heterozygotes when the enzyme activity in the
roots is compared on a protein basis. The primordial cell pool for hair roots is concluded to
be larger than previously thought. Hair root ana
may be superior to other methods for the detecti
of Fabry heterozygotes, since it is reliable as
as convenient. (13 references)

6402 HAIR SHEATH TUMOURS OF SCALP. (Eng.)
gava, S. (Dept. Pathology and Bacteri
M.G.M. Medical Coll., Indore, India); Malaviya,
K.; Monga, J. N. *Indian J Cancer* 13(1): 15-24;

The hair sheath tumors of the scalp, trichochla
cyst, a benign cyst, and trichochlamydocarcinom
indolent carcinoma with little potential for re
rence or metastasis, were studied retrospective
an analysis of reports of skin tumors filed at
M.G.M. Medical College from 1953 to 1974. These
sheath tumors are uncommon, occurring almost ex
sively on the hairy scalp and appearing most fr
quently in elderly women. Of the 760 reported t
73 were scalp tumors, of which there were 12 tr
chlamydocysts (6 in females) and 9 trichochlamy
cinomas (5 in females). The average age of thes
patients was 50 yr. The lower outer hair sheath

ongly suggested as the origin of these tumors. chochlamydocarcinoma was not found until 1960, there has since been a regular increasing inci- ce. The relationship of these tumors to the in- ased use of hair oils, dyes, and other cosmetics conjectured. (13 references)

3 BEHAVIOR OF CONNECTIVE TISSUE AROUND TUMORS OF MELANIN-FORMING TISSUES. (Ger.) Steig- er, G. K. (Univ.-Hautklinik, Joseph-Stelzmann-Str.)-5000 Koln 41, West Germany); Uerdingen, R. *tarzt* 27(4): 153-154; 1976.

invasion of collagenous tissue by malignant anomas is discussed. Histological sections of 11 ive pigment cell nevi with junctional activity, benign juvenile melanomas, 10 premalignant melan- s, and 14 early malignant melanomas with junction ivity (preferential invasion to the cutis) were veyed under polarized light and by microradiog- ny. The collagen was diminished in the tumor cell tumor infiltration areas corresponding to tumor l density. Connective tissue fibers were only asionally compressed. Collagen fibers were not inished in 2/10 premalignant melanoses that were confined strictly to the epidermis. Collagen letion or disorientation did not differ in pig- cell nevi and malignant melanomas. Collagenous ndary areas formed around the clusters of nevus ls; they were absent from the melanoma prepara- ns and were either reduced or absent in the pre- ignant melanoses and benign juvenile melanomas. references)

4 ULTRASTRUCTURE OF HUMAN UVEAL MELANOMAS CULTURED IN VITRO. (Eng.) Bucek, J. (Inst. iology, Medical Faculty, 662 63 Brno, Czechoslo- a); Vrba, M. *Neoplasma* 23(1): 109-117; 1976.

is a report of the first ultrastructural de- ption of human uveal melanocytes acquired from t-term tissue cultivation. The histology of the d-cell type uveal melanoma shows two main types ells: (1) round epitheloid cells and (2) fusiform s corresponding in their composition and shape he spindle B cell. Little rough endoplasmic culum and varying numbers of polysomes were d in both cell types. Smooth endoplasmic retic- and Golgi apparatus were abundant in both cell s. Smooth endoplasmic reticulum was the most acteristic structure in the cultivated cells, its role in the formation of premelanosomes fine structure of both cell types is also dis- ed in detail. (20 references)

ON THE ULTRASTRUCTURE OF PROLIFERATIVE CHANGES (CELL METAPLASIA) IN THE RETINAL IENT EPITHELIUM OVER MALIGNANT MELANOMAS OF THE ROID. (Ger.) Lerche, W. (Universitaets-Augenklinik, tinistr. 52, D-2000 Hamburg 20, West Germany); o, K. H. *Albrecht von Graefes Arch Klin Ophthalmol* 199(3): 293-302; 1976.

Light and electron microscopic findings in three eyes that were enucleated because of choroid melanoblastoma in patients 60 and 65 yr of age are reported. The posterior pole, equator, and ora serrata were the sites examined for the proliferation of pigment epithelium. The proliferation was characteristic for each location in cell shape, cytoplasmic structure, and intracellular filament formation. At the posterior pole the proliferating cells most nearly resembled normal epithelium; however, many presented a wide free surface with only minimal contact with neighboring cells. These cells could be released as macrophages. In both the equator and ora, the cells showed a decrease in smooth, and an increase in rough, endoplasmic reticula. Proliferating cells in the ora were lacking apical processes and were surrounded by fine fibrils. The equator cells were also embedded in a fine fibrillar intercellular substance; some cells also featured intracellular fiber deposition, resembling astroglia. These results confirm other interpretations of pigment cell dedifferentiation to astrocytic cells of an immature type. (19 references)

6406 MULTIPLE PRIMARY CANCERS IN PATIENTS WITH MALIGNANT MELANOMA. (Eng.) Boland, S. L. (Melanoma Unit, Sydney Hosp., Univ. Sydney, Sydney, N.S.W. 2000, Australia); Shaw, H. M.; Milton, G. W. *Med J Aust* 1(15): 517-519; 1976.

Twenty-one patients with primary malignant melanoma who developed a second and unrelated cancer were examined. The incidence of these second tumors was much higher than expected from the general population. The most common secondary sites were the breast (six), lymphatic and hemopoietic tissue (six), colon/rectum (three), ovary (three). It is concluded that the occurrence of malignant melanoma predisposes the patient to a secondary unrelated cancer. However, they could not determine what genetic, environmental, or immunological factors were involved. The consensus of opinion is that one cancer does not confer immunity from additional cancers; indeed, the reverse may be true. (11 references)

6407 PRIMARY MELANOMATOSIS. (Ger.) Korting, G. W. (Univ.-Hautklinik, 65 Mainz, Langenbeckstrasse 1, West Germany); Bork, K.; Schneider, S. *Med Welt* 27(1): 17-21; 1976.

The histories of 10 patients with multiple primary melanoma in a clinical melanoma population of 269 are reviewed, and some statistics are derived. Nine of the 10 presented with two primary tumors and 1 case had three. Histologically, seven patients had nodular blastomas in the primary and subsequent growths; two had nodular primary type tumors, but subsequent tumors were classified as superficial spreading types. The interval between primary neoplasia and subsequent occurrence varied from simultaneous to 12 yr. (20 references)

6408 CYTOCHEMICAL FINDINGS IN CHRONIC MONOCYTIC LEUKEMIAS. (Ger.) Richter, W. (Medizinische Klinik der Medizinischen Akademie Dresden, DDR-8019 Dresden, Fetscherstrasse 74, East Germany); Fleischer, J.; Irmscher, J. *Folia Haematol (Leipz)* 102(6): 524-529; 1975.

Six case histories of adult chronic monocytic leukemia are analyzed. One 80-yr-old woman presented with a frank peripheral monocytosis 15 yr before death and 7 yr prior to clinical leukemia. Hepatosplenomegaly was gradual during the 8-yr interval. Naphthylacetate esterase increased and PAS decreased in peripheral and sternal puncture monocytes in the years preceding exitus, which was heralded by a blastic crisis of immature myeloid elements. Half of the leukocytes were monocytic. This pattern typified the clinical course of three other cases of chronic monocytic leukemia. Moreover, two other patients--one with chronic myeloid leukemia with monocytic phases and one with a preleukemic panmyelopathia and monocytic reactions--presented with similar enzymatic profiles. (23 references)

6409 CONTRIBUTION TO THE CYTOLOGICAL AND CYTOCHEMICAL STUDY OF THE BLAST CELLS IN THE ACUTE PHASE OF CHRONIC MYELOID LEUKEMIA. (Ita.) Castoldi, G. L. (Clinica Medica Generale dell'Universita, Ferrara, Italy); Grusovin, G. D.; Scapoli, G. L. *Minerva Med* 66(49): 2378-2386; 1975.

In the acute stage of chronic myeloid leukemia (CML), the blast cells may have different chromosomal and metabolic properties. These differences were studied cytochemically in eight blastic patients who had been treated previously with busulfan and who had a positive Ph^1 at the chronic stage. The results indicate that the immature elements are almost exclusively myeloblastic in the chronic stage, but only about half can be regarded as such in the acute stage (positive for AS D chloroacetate esterase). In the acute stage, intermediate elements (positive for α-naphthyl esterase and AS D chloroacetate esterase) as well as megakaryocytic elements (positive for PAS and α-naphthyl esterase) increase significantly. A diffuse reaction to β-glucuronidase, characteristic of myeloblastic cells, was frequently observed. Some PAS- and AS D chloroacetate esterase-positive elements were classified as atypical myeloblasts following acid phosphatase and β-aminopeptidase reactions. Blastic crisis thus seems to be an expression of a Ph^1-positive cellular clone that is highly reactive to the initial stage of the disease and greatly modified metabolically (inhibited differentiating capacity). This supports the idea that the acute blastic stage is an illness within an illness, the origins of which can be observed at the beginning of the CML, and the more apparent manifestation consists only of the excessive and apparently uncontrollable proliferation of granuloblasts. CML in its acute state seems to reflect a maturation defect of the stem cells that attempt polymorphous differentiations. (42 references)

6410 ACCELERATED MYELOBLAST DESTRUCTION AND ABNORMAL LYSOSOME DISRUPTION IN CULTURED BONE MARROW: ASSOCIATION WITH INDOLENT ACUTE MYELO ENOUS LEUKEMIA. (Eng.) Branda, R. F. (Dept. Medici Univ. Minnesota Hosp., Minneapolis, MN 55455); Jac H. S.; Douglas, S. D.; Moldow, C. F.; Puumala, R. *Blood* 48(1): 23-32; 1976.

The case is presented of a 26-yr-old Caucasian woman who, without treatment, lived asymptomatically over a year after relapse of acute myelogen leukemia (AML). She maintained nearly normal level of platelets and hemoglobin. Cytochemical and elec tron microscopic studies of her bone marrow in li culture revealed on several occasions a unique mat tional sequence: leukemic cells differentiated to form morphologically abnormal primary granules tha appeared to rupture and cause cytolysis of these cells. Blasts rapidly disappeared and were replac by more mature granulocytes, in contrast to observ tions in cultures from five other patients with A in relapse that showed persistently elevated blas counts with no evidence of maturation in vitro. These findings support the concept that in AML ce maturation is regularly impaired and in some case also aberrant. (24 references)

6411 MULTIPLE MYELOMA IN TWO BROTHERS. IMMUN GLOBULIN LEVELS AMONG THEIR RELATIVES. (Eng.) Wiedermann, D. (Dept. Pathological Physiol Faculty Medicine, Purkyne Univ., 662 43 Brno, Cze slovakia); Urban, P.; Widermann, B.; Cidl, K. *Neoplasma* 23(2): 197-207; 1976.

Multiple myeloma in two brothers aged 83 and 74 y is described. Bone-marrow biopsy showed an infilt tion of abnormal plasma cells. X-ray examination the skeleton revealed typical osteolytic changes one patient and diffuse osteoporosis in the other Moreover, both patients had a massive monoclonal protein fraction in the serum and Bence-Jones protein in the urine. In one case the monoclonal ser protein was of the IgG-K type and in the other, o the IgA-K type. Immunoglobulin studies among heal relatives of the two brothers demonstrated much higher incidence of the polyclonal increase in on immunoglobulin class than could be expected in th population. Without evidence of monoclonal serum protein, unusually high IgA serum levels, more th 500 mg/100 ml, were observed in 7/17 healthy fami members. The results support a genetic basis in connection with the familial occurrence of myelom either by an abnormal distribution of plasma cell clones or by their abnormal activity. (23 references)

6412 ERYTHROCYTE MEMBRANE MODIFICATION IN MA NANT DISEASES OF MYELOID AND LYMPHORETI TISSUES. I. TN-POLYAGGLUTINATION IN ACUTE MYELOCY LEUKAEMIA. (Eng.) Bird, G. W. (West Midlands Regi Blood Transfusion Service, Vincent Drive, Edgbast Birmingham B15 2SG, England); Wingham, J.; Pippar M. J.; Hoult, J. G.; Melikian, V. *Br J Haematol*

): 289-294; 1976.

l grouping problems caused by Tn polyagglutina-
(persistent mixed-field polyagglutination) were
in a 63-yr-old man with acute myelocytic leu-
. It was difficult to determine the blood group
his patient: the RBC were agglutinated by anti-A,
-B, and anti-(A + B) sera, but a mixed-field
ern was observed. Furthermore, the RBC were
tinated in a similar manner by AB serum, and
-A and anti-B were present in his serum. Thus
rue group was I, and about 90% of his RBC were
gglutinable. Tests with extracts of *Arachis*
aea and *Salvia sclarea* confirmed the existence
polyagglutination. It was also difficult to
ify the type of leukemia precisely. The patient
red at first to have a myelocytic or myelomono-
leukemia, but increased numbers of mature
ophils in the peripheral blood and large num-
of abnormal monocytoid cells suggested a Phila-
ia chromosome-negative atypical chronic granulo-
leukemia or chronic myelomonocytic leukemia.
marrow examinations after therapy showed a
essive impairment of granulocyte maturation,
nating in an acute blast cell phase unrespon-
to cytotoxic therapy. A degree of marrow hypo-
a or sclerosis was also suggested, and there
arly involvement of the lymph nodes. Also, 5 mo
the original evaluation, there was no evidence
polyagglutination. The disappearance of Tn
gglutination either spontaneously or after
oxic drug therapy supports the theory that the
of erythrocyte membrane modification is the
marrow and that the condition probably arises
matic mutation, with the development of an
mal clone. (22 references)

ERYTHROCYTE MEMBRANE MODIFICATION IN MALIG-
NANT DISEASE OF MYELOID AND LYMPHORETICULAR
ES. II. ERYTHROCYTE ''MOSAICISM'' IN ACUTE
ROLEUKAEMIA. (Eng.) Bird, G. W. (West Midlands
nal Blood Transfusion Service, Vincent Drive,
ston, Birmingham B15 2SG, England); Wingham,
hester, G. H.; Kidd, P.; Payne, R. W. *Br J*
tol 33(2): 295-299; 1976.

yr-old man with erythroleukemia had RBC that
a mixture of normal B and very weak B groups.
his blood was first tested, it was placed in
B, but there were many unagglutinated RBC in
with both anti-B and anti-(A + B) sera. The
ere thought to consist of about 40% group B and
f apparently group O cells. When such a mixed-
reaction occurs, it is helpful to separate the
opulations; this was done using the anti-(A +
ctin from the seeds of *Phlomis fruticosa*. The
n reacts very strongly with A_1 or B cells but
cells or those of weak forms of A or B. The
opulations were found to be confined to the ABO
group system. The H, I, and i antigens of both
populations were normal. The unagglutinated
were not of group O but a very weak form of B
were not agglutinated by anti-B reagents but
ake up anti-B. There was enough serum B-gene
syltransferase for development of a normal B
en, and thus normal B cells. However, apparently
part of the erythropoietic tissue had lost the function related to the formation of ABH-active sites. The final step in this site formation probably occurs in the bone marrow at a previously unidentified stage in erythropoiesis. Since only part of the tissue was involved, a population of very weak B cells was also produced. (15 references)

6414 A NEW TRANSLOCATION IN CHRONIC MYELOGENOUS LEUKEMIA. (Eng.) Pravtcheva, D. (Centre Oncology, Sofia 56, Bulgaria); Andreeva, P.; Tsaneva, R. *Hum Genet* 32(2): 229-232; 1976.

A reciprocal translocation involving chromosomes Nos. 3 and 22 was found in a patient with seemingly Philadelphia Chromosome (Ph^1) negative chronic myelogenous leukemia (CML). G band analysis revealed that deletion in No. 22 occurred at the same point as in the typical cases of the disease. It was concluded that breakage in No. 22 at a specific site with spatial disjunction of the resulting segments might be the crucial cytogenetic event in the genesis of CML, Ph^1 not being an obligatory result of the rearrangement. (11 references)

6415 ACUTE NONLYMPHOCYTIC LEUKEMIA IN ADULTS: CORRELATIONS WITH Q-BANDED CHROMOSOMES. (Eng.) Golomb, H. M. (Box 420, Univ. Chicago Hosp., 950 East 59th St., Chicago, IL 60637); Vardiman, J.; Rowley, J. D. *Blood* 48(1): 9-21; 1976.

The authors obtained chromosome banding patterns for 50 of 55 consecutive adult patients with acute nonlymphocytic leukemia during a 5-yr period. Of the 50 cases, 20 were diagnosed as acute myelocytic leukemia (AML), 24 as acute myelomonocytic leukemia (AMMol), 2 as acute promyelocytic leukemia (APL), and 2 as erythroleukemia. Twenty-five patients had initial chromosome abnormalities, and five more developed abnormalities during the course of the disease. The median survival of patients with normal chromosomes initially was 10 mo, whereas that of patients with abnormal chromosomes initially was 2 mo. Similar times were obtained for treated patients with AML and AMMol. However, when the AML patients were separated into those with and those without a chromosome abnormality, the median survival times were markedly different (2 mo and 18 mo, respectively). Patients with AMMol demonstrated no difference in median survival times when subgrouped according to the presence or absence of chromosome abnormalities. The treated patients with initially abnormal chromosomes, whose marrow samples had only abnormal metaphases, had a poorer response (10% complete remission) and median survival (2 mo) than those who had at least one normal metaphase (42% complete remission with a median survival of 9 mo). The two cases of APL demonstrated a deletion of the long arm of No. 17, which occurred in the same region of the chromosome in each case. Both patients had similar clinical histories, with disseminated intravascular coagulation, and neither responded to therapy. (20 references)

6416 FACTORS RELATED TO TUMOUR SPREAD IN THE BODY.

(Eng.) Boggust, W. A. (Dept. Experimental Medicine, Trinity Coll., Dublin, Ireland). *Adv Tumor Prev Detect Charact* 3: 383-390; 1976.

Enzymes degrading collagen, reticulin and tumor matrix structures were examined in extracts of human cancers. The activities identified included cathepsins B, C, and D, leucine aminopeptidase, glucosaminidase, acid and neutral collagenases, and fibrinolytic enzyme. Collagenase was blocked by the chelating agents dimercaptopropanol (BAL), EDTA, and o-phenanthroline. The cyclic imides inhibiting collagenase included the cytotoxic and cytostatic drug ICRF-159, which inhibited hydroxyproline and carbohydrate release from collagen and reticulin and the hydrolysis of Pz-substrate at pH 7.2. Combinations of phenanthroline and ICRF-159 were synergistic and produced increased inhibition. ICRF-159 inhibited the cathepsins C and B_1 and probably glucosaminidase but not cathepsin D or LA peptidase. Mice bearing implanted carcinomas excised on the 10th day died from lung metastases within 34 days unless otherwise treated. Survival periods were increased by ICRF-159 but not by o-phenanthroline alone. Combinations of ICRF-159 and o-phenanthroline substantially increased the survival period. The reduction in experimental metastases obtained with ICRF-159 corresponds with earlier results. The increased survival of mice receiving ICRF-159 supplemented with phenanthroline indicates that, in addition to the cytotoxic activity of ICRF-159, collagenase-inhibitors may have an independent role affecting the release of primary tumor cells before dispersion. The overall effect may be related to inhibition of hydrolytic enzymes degrading collagenous structures in the cancer stroma and vascular wall; cytotoxic action on primary tumor cells leading to reduced output of vascular growth-promoting factors; and cytotoxic action on irregularly proliferating vascular endothelial cells. (31 references)

6417 MARKEDLY ELEVATED ANGIOTENSIN CONVERTING ENZYME IN LYMPH NODES CONTAINING NON-NECROTIZING GRANULOMAS IN SARCOIDOSIS.

(Eng.) Silverstein, E. (Lab. Molecular Biology, Dept. Medicine, State Univ. New York, Downstate Medical Center, 450 Clarkson Ave., Brooklyn, NY 11203); Friedland, J.; Lyons, H. A.; Gourin, A. *Proc Natl Acad Sci USA* 73(6): 2137-2141; 1976.

Sarcoidosis is characterized by the generalized formation of granulomas and is accompanied by elevation in the serum in less than half the patients of angiotensin converting enzyme (ACE), a dipeptidyl carboxypeptidase that catalyzes the conversion of the decapeptide, angiotensin I, to the pressor octapeptide, angiotensin II, and L-histidyl-L-leucine. This work was undertaken to elucidate the source of the increased circulating ACE by enzymatic study of lymph node and lung biopsies made for morphologic diagnosis in patients with clinical sarcoidosis. Mean activity of ACE was elevated generally more than tenfold in granuloma-containing lymph nodes, but not in the lung (in which normally it is abundant) in 19 of 20 patients with sarcoidosis. ACE i the lymph nodes from subjects with sarcoidosis was similar to the enzyme from normal lung and lymph node with respect to activity as a function of pH, inhibition of activity by EDTA and o-phenanthrolin gel filtration on Sephadex G-200, and requirement for chloride for activity, but appeared to be more heat-labile. The data suggest that the granulomas sarcoidosis may be the source of the elevated seru enzyme and that cells of the granulomas, particula the epitheloid cells (which appear by electron mic copy to have active protein biosynthesis), may be actively synthesizing the enzyme. (25 references)

6418 FAMILIAL RETICULUM CELL SARCOMA.

(Eng.) Escobar, V. (No affiliation given); Bixler, D. *Birth Defects* 12(1): 151-158; 1976.

A family in which individuals in six successive generations had reticulum cell sarcoma (RCS) is described. The proband was a 74-yr-old diabetic female admitted with a 6-mo history of pain in the epigastric region. X-rays of the gastrointestinal tract showed a filling defect on the greater curvature that proved histopathologically to be RCS. Family history revealed multiple occurrences of cancer in the proband's siblings and other near relatives. The total number of family members trac is 116, of which 13 have had multiple occurrences and recurrences of adenocarcinoma, carcinoma and RCS. In the third generation, all five female siblings suffered from the disease. Three of these f males have passed the condition on to their childr grandchildren, and great-grandchildren. Sixteen deaths have been documented, of which seven were to RCS. It is noted that the husbands of two thir generation sisters died from leukemia and Hodgkin disease. It is suggested that a genetic predispos tion to cancer that appears to have a simple mode inheritance is present in this family. A second hypothesis is the transmission of a viral genome mimicking genetic transmission. (35 references)

6419 DOUBLE TRISOMIC CELLS FROM A BOY WITH CHRONIC MYELOPROLIFERATIVE DISORDER.

(E Lin, C. C. (Div. Pediatrics, Faculty Medicine, Un Calgary, Calgary, Alberta, Canada); Whaun, J. M.; Dundas, J. B. *Chromosomes Today* 5: 261-264; 1976.

Direct chromosome preparations from the marrow cells of a boy with splenomegaly thrombocytosis leucopenia showed a karyotype of 48, XY, C+, G+. that time he was thought to have either a preleuk or a myeloproliferative-type marrow. To determine whether cells with different chromosome complemen differed in response to in vitro culture conditio chromosomes from short-term cultures of marrow ce and peripheral lymphocytes were examined with the use of phytohemagglutinin (PHA) and pokeweed mito (PWM) to stimulate cell proliferation. Chromosome analysis on 25 cells from an uncultured marrow sa ple revealed 48 chromosomes, the extra ones being

8 and 21. Two types of cells were found in the
ow and lymphocyte cultures with PWM: one type
48 chromosomes with a karyotype 48, XY, +8, +21;
other had a normal male karyotype. Cells cultured
PHA showed only normal karyotypes. Thus, the
le trisomic cells and the cells with a normal
otype may have a different response to in vitro
ures. (7 references)

FAMILIAL CANCER ON A SCOTTISH ISLAND.
(Eng.) Hill, R. D. (Western Isles, Scot-
. *Br Med J* 2(6032): 401-402; 1976.

edigree of a patient with Fanconi's anemia is
nted. When the causes of death were determined
relations, 10 were found to be due to carcinoma
rious organs. Cases of osteogenic sarcoma,
emia, and Marfan's syndrome were also discovered.
amily lived on a remote island whose inhabitants
d to intermarry. The data indicate a genetic
in these diseases. In experimental animals
ic susceptibility has been shown to determine
requency and type of neoplams for both spontane-
umors and those induced by chemical carcinogens
cogenic viruses. Familial clusters of neoplasms
ell-known. The data are insufficient to conclude
individuals who are heterozygous for the Fan-
gene have a higher incidence of chromosome
ations, but they are suggestive. Further studies
eeded to identify gene carriers and to see if
is an increased rate of chromosome aberrations
latives who develop cancer. Links between several
ic diseases and leukemia suggest that these
asms require genetic susceptibility. Studies
as this may be valuable for the study of cancer
it seems in several cases that heterozygosity
sposed to cancer. (13 references)

CYTOGENETIC STUDIES IN FOUR CASES OF FANCONI'S ANEMIA.
(Fre.) Berger, R. (Centre de
rches biologiques neo-natales, Hopital Port-
, 75674 Paris, France); Bussel, A.; Schenmetzler,
uv Rev Fr Hematol 15(5): 539-550; 1975.

enetic studies were carried out in four chil-
with Fanconi's anemia (two sets of brothers: A1
2, and B1 and B2; aged 5, 9, 6-1/2 and 5 yr,
ctively, at the time of the first examination).
atients were from different and nonconsanguine-
arents. The chromosome analyses were carried
n 72-hr blood cultures and in bone marrow cells
incubation for 1 hr at 37 C. The G bands were
ned with the urea and trypsin methods. The
types in the blood cells were normal in the
ren and parents of sets A and B. Asymmetry of
osome 16 (the secondary constriction of the
arm displayed toward the short arm) was found
. This anomaly was present in the father but
n the brother. The number of breakages and
angements in lymphocyte cultures was low in the
ldren and parents. An abnormal clone with 47
osomes (47, XY, + 21) was found in the bone
w cells of A1; aneuploids with six elements in
Group G were present in 66/122 cells examined. In A2 a cell (1/107) with many rearrangements (r,f) suggested the diagnosis of Fanconi's anemia. In set B, a 16 qh + chromosome in B2 and his mother was the only variation observed. The first cytogenetic examination of B1, performed 18 mo after the onset of disease, showed 45.7% cells with rearrangements; 22 mo later the percentage was only 11%. In B2, 19.4% cells with rearrangements were seen at the time of diagnosis and 21.4% 22 mo later. Corresponding levels in B patients were 4.4% for the mother and 1.6% for the father. These findings are comparable to those generally described in cases of Fanconi's anemia. The presence of the abnormal clone in A1 is attributed to a somatic segregation. It is not known whether the presence of an abnormal clone indicates a hematological compliction of the disease. The hypothetical significance of chromosome anomalies in preleukemic transformations would indicate the necessity of systematic cytogenic studies in patients with Fanconi's anemia. (37 references)

6422 CONGENITAL MULTIPLE FIBROMATOSIS: CLINICAL AND GENETIC INVESTIGATIONS.
(Ger.) Pflueger, H. (I. Chirurgische Univ.-Klinik, Alser Strasse 4, A-1000 Vienna, Austria); Kolb, R.; Mayr, W. R. *Wien Klin Wochenschr* 88(3): 92-94; 1976.

Clinical and genetic data in a vertical study of seven family members with multiple fibromatosis are reported. Differential diagnosis between the benign and malignant states is difficult since the nodular borders are blurred. In six of the patients multiple fibromas were confirmed histologically in a variety of localizations. In one patient only was there a single fibroma on the transverse colon; there were also many sc fibromas. Multiple connective tissue fibromas had been identified in earliest childhood in some of the probands. One female experienced rapid nodular proliferation in one breast and novel nodular growth in the contralateral breast 2 wk postpartum. A thorough genetic assay was performed. The gene appears to be autosomal dominant and is probably localized on chromosome 1. (15 references)

6423 KARYOTYPE, MARKER FORMATION, AND ONCOGENICITY IN MOUSE PLASMACYTOMAS.
(Eng.) Shepard, J. S. (Dept. Pathology, Dartmouth Medical Sch., Hanover, NH 03755); Pettengill, O. S.; Wurster-Hill, D. H.; Sorenson, G. D. *J Natl Cancer Inst* 56(5): 1103-1111; 1976.

The chromosomal markers in the induced plasmacytomas of BALB/c mice (MOPC-21 and MOPC-315) and in the spontaneous tumors of C3H mice are compared. The two common chromosome markers in the two plasmacytomas previously examined by Giemsa banding were consistently present in mouse plasmacytoma X-5563, a transplantable hypertetraploid tumor of spontaneous origin in C3H mice. The two markers were found in both induced and spontaneous tumors and in either BALB/c or C3H mice. The derived cell line (WU-29) had 17 fewer chromosomes than the X-5563 tumor, it was oncogenic, and its modal karyotype was identical to that of the tumor transmitted by cell line inoculation. The homogeneity of a slight karyotypic modification in a second tumor suggested a possible clonal origin. The high frequency of centric fusions between homologs and the structure of certain markers suggests that homolog association may precede marker formation. A second mechanism of marker formation, selective regional elongation, is proposed to account for the larger number of markers with proximal or distal elongations, without evidence of translocation, and for the observed alterations in length and banding pattern of markers after growth in vitro. Comparison of MOPC-21, MOPC-315, and X-5563 tumors showed preferential involvement of certain chromosomes in marker formation, an inferred association of the two common markers with an early stage in the origin of the three plasmacytomas, and consistent loss of an X chromosome. Loss of oncogenicity in the cell lines was associated with a number of karyotypic changes, but it did not require the loss of the characteristic markers or additional copies of a specific normal chromosome. (52 references)

6424 CHROMOSOME BANDING STUDIES OF SEVERAL TRANSPLANTABLE HEPATOMAS.

(Eng.) Kovi, E. (Dept. Biochemistry, Cancer Res. Unit, Howard Univ., Coll. Medicine, Washington, DC 20059); Morris, H. P. *Adv Enzyme Regul* 14: 139-162; 1976.

The karyotypes of six aneuploid rapidly growing transplantable hepatomas were examined by banding techniques. The tumors with a long transplant history (3683, 7288C, 3924A) showed the most complex structural rearrangements, yet they were more homogenous than tumors with a shorter transplant history, such as 9611B and 9618A_2. Passage of a tumor through tissue culture increased the number of karyotypic variations even within the same stemline cells (7288Ctc). Chromosomes with normal banded patterns could be identified with great accuracy from the altered karyotypes of these hepatomas. Autosomes from the acrocentric group were preferentially involved in markers (Nos. 2, 6, 10). The most frequent chromosome rearrangements in these fast-growing hepatomas were derived by fusion and/or pericentric inversion of normal autosomes. The origin of most structurally rearranged chromosomes could be traced by their banding pattern. One identical marker, derived by pericentric inversion of the No. 2 chromosome, was present in five hepatoma cell lines, but no identical rearrangement common to all six tumors was evident. However, common genetic changes occurring during the development of these neoplastic cells were undetectable by the relatively gross bands observed at the chromosomal level. (31 references)

6425 HEREDITARY TRANSMISSION OF INDIVIDUAL SUSCEPTIBILITY TO DEVELOP MALIGNANT TUMORS.

(Ger.) Bundschuh, G. (Abteilung Klinische Immunologie, Bereich Medizin (Charite) der Humboldt-Universitat zu Berlin, 104 Berlin, Ziegelstrasse 5-12, East Germany); Gubatz, W.; Doering, E.; Noack, C.; Borgwardt, G.; Fischer, M. *Dtsch Gesundheitswes* 31(8): 340-344; 1976.

Clinical evidence was compiled that rejects the
hypothesis that the distribution of Xh protein, a
pregnancy-associated α_2-glycoprotein, in the parents of the tumor-bearing offspring differs consi
ably from that in parents with unaffected offspri
The experimental population included 87 children
1-14 yr old of both sexes, both parents of 58 of
these children and, in another 27 cases, either
semiquantitatively by precipitation electrophores
using human Xh antiserum. Among the affected male
children who were Xh-positive, 20 had acute lymph
cytic leukemia, 8 lymphogranulomatosis, 6 various
sarcomas, and 2 Wilms' tumor; there were single
cases of histiocytosis-X, neuroblastoma, hemangio
dothelioma, Burkitt's lymphoma, and botryoid sarc
Xh-negative boys included only two acute lymphocy
leukemias and one Wilms' tumor. Xh-positive girls
included 15 acute lymphocytic leukemias, 6 lympho
granulomatoses, 11 sarcomas of various types, 6
Wilms' tumors, 2 neuroblastomas, 1 histiocytosis-
and 1 retinoblastoma; an absence of Xh occurred o
in 1 case with Wilms' tumor. In 42 cases with bot
parents Xh-positive, 19 male and 20 female childr
were also positive; no females and only 3 males w
negative. In the one case where the father was po
tive and the mother negative, a male child was po
tive. Six boys and 9 girls were positive in 15 ca
where the mother, but not the father, was positiv
no Xh negatives were found. There were no affecte
children of negative parents. Each of these paren
distributions was statistically significant (p =
0.01), except for the one case in which the fathe
was positive and the mother negative. Application
a probability calculus showed that children with
Xh-positive fathers or mothers have an 11-21 time
higher risk, respectively, of tumor formation tha
those with Xh-negative parents. With an approxima
tion method adapted to multiple probabilities, it
was calculated that an Xh-positive child is 60 ti
more susceptible to tumor formation than an Xh-ne
tive child. (7 references)

6426 SUPPRESSION OF MALIGNANCY IN HUMAN CELL

(Eng.) Stanbridge, E. J. (Dept. Medical
Microbiology, Univ. California, Coll. Medicine,
Irvine, CA 92664). *Nature* 260(5546): 17-20; 1976.

The suppression or retention of malignancy after
hybridization was studied with the use of two mal
nant cell populations (D98/AH-2 and HBU, both He
variants) and actively proliferating or senescent
diploid human fibroblasts as the normal parent c
population. Cell fusion was accomplished with in
tivated Sendai virus. Hybridization was performe
between malignant-malignant (m-m) and malignant-
normal (m-n) cells. All the m-n hybrids were bet
the parent lines morphologically. Their organizational behavior was more like that of the malign
parent. The m-m hybrids behaved in all respects
their malignant parents. Chromosome analyses rev
that the hybrids lost chromosomes early after fu
whether this loss was random or nonrandom could
be determined. In a malignancy assay, three type
immunosuppressed mice (neonatally thymectomized

reconstituted thymectomized, irradiated wean-
and nude mice) were used. Various concentra-
of cells were injected into the mice. The
ssion of malignancy in the m-n hybrid cells
mplete; as many as 1 x 10^7 cells failed to
e a tumor. Periodic monitoring for 6 mo has
ed no tumors to date. This study demonstrates
alignancy behaves as a recessive trait in
cells. The studies with m-n hybrids indicate
enescent normal fibroblasts can be rescued by
with malignant HeLa cells and attain immor-
. Thus, senescence of human fibroblasts in
es behaves as a recessive trait when the
lasts are fused with HeLa cells. The m-n hybrids
oliferate indefinitely, but they are not ma-
t; the use of human-human hybrids may provide
for transformation events to be separated
he event(s) leading to malignancy. (40 ref-
s)

A QUANTITATIVE MICROSCOPICAL STUDY OF
TUMOUR CELL NUCLEI IN LYMPHATIC METASTASIS,
A QUANTIMET. (Eng.) Westby, S. (Dept. Pathol-
niv. Sheffield, Sheffield, England); McGinty,
rr, I. *J Pathol* 119(1): 5-9; 1976.

athologists hold that the more pleomorphic a
is, the more malignant it is. Studies on the
nd size range (pleomorphism) of the nuclei
or cells metastatic in lymph nodes and in
te from which the metastasis derived are
bed. Two systems were examined, the metastasis
Rd3 tumor in rats and six cases of human
cancer that had metastasized to the axillary
nodes. In nearly all specimens examined, the
in the lymph node metastasis and the nuclei
primary site were similar in size. In two of
x cases of human cancer, some pleomorphism, as
ed by nuclear size, was observed. Several
ations for the human observations are presented.
erences)

HETEROTOPIC CHONDROGENESIS AND OSTEOGENESIS
INDUCED BY TRANSFORMED CELLS: USE OF NUDE
S A MODEL SYSTEM. (Eng.) Ostrowski, K. (Dept.
ogy and Embryology, Inst. Biostructure, Med-
ch., Warsaw, Poland); Wlodarski, K.; Aden, D.
c Cell Genet 1(4): 391-395; 1975.

ine of HeLa cells was shown to induce car-
and bone formation in congenitally athymic
mice when injected im (2 x 10^6 cells in 0.1
phosphate-buffered saline). The chondrogenesis
teogenesis observed were similar to those
when other inducing epithelia are injected im
ortisone-treated mice. A tumorigenic simian
40 T antigen-positive human-mouse somatic cell
with human chromosomes C7 and C6 did not
cartilage or bone formation under similar
ions. The nude mouse may thus provide a system
ch to investigate experimental host-cell dif-
iation without the complications of immunosup-
on. (16 references)

6429 AN EXPERIMENTAL MODEL FOR LYMPHATIC METASTASIS IN RATS. (Eng.) Takazawa, H. (Div. Physiology and Pathology, Natl. Inst. Radiological Sciences, Anagawa 4-9-1, Chiba 280, Japan); Shimizu, S. *Gann* 67(3): 403-406; 1976.

Spontaneous lymph node metastasis were induced by transplanting tumor cells of the rat ascites hepatoma AH-109A into the sc tissue of the penis, which is rich in lymph plexus. Tumor growth at the transplantation site was measured serially, and metastasis was recognized by palpation in the inguinal lymph nodes initially, and then in the axillary and lumbar nodes. These lymph nodes were weighed when the animals were sacrificed 12 days after transplantation, and a high percentage of metastasis was confirmed by histological examination. (19 references)

6430 LACTATE DEHYDROGENASE ISOZYME SPECTRUM IN MOUSE MAMMARY GLAND TUMORS AND METASTASES IN THE LUNGS. (Eng.) Tereshchenko, I. P. (Lab. Pathophysiology, P. A. Gertsen Oncological Res. Inst., Moscow); Boikova, V. I.; Zaretskaya, I. S. *Bull Exp Biol Med* 80(12): 1484-1486; 1975.

The lactate dehydrogenase isozyme spectrum was investigated in the mammary glands, lungs, spontaneous mammary gland tumors, and metastases of tumors in the lungs of female mice of the cancer prone strain C3H that had given birth. Differences in the isozyme spectrum of the metastases and tumors were reflected in the larger fractions migrating to the anode in the metastatic nodes ($P < 0.001$). The presence of a metastasis in the lung was accompanied by a cathodal shift in the isozyme spectrum of the lung tissues. (9 references)

6431 AN EXPERIMENTAL APPROACH TO STUDYING ORGAN SPECIFICITY OF PULMONARY TUMOR METASTASIS. (Eng.) Nicolson, G. L.; Winkelhake, J. L. *In: Cell Surfaces and Malignancy. Meeting Held in Bethesda, September 11-13, 1974.* John E. Fogarty International Center for Advanced Studies in the Health Sciences; Natl. Insts. Health. (Bethesda, MD): pp. 271-276; 1975.

Two of the most important and little understood properties of malignant cells are their invasiveness to adjoining tissues and their ability to break away from primary tumor locations and spread to distant parts of the host. The latter process and the resulting formation of distant secondary tumors occur by tumor cell transportation from primary sites via the bloodstream or the lymphatics or by transport in coelomic cavities. There is evidence that the occurrence and extent of pulmonary metastasis in a susceptible host are determined by the unique properties of the tumor cells themselves, and not just by random survival. Preliminary results on the arrest of bloodborne metastases due to specific organ recognition an adhesion were obtained with B_{16} melanoma cell lines in ascites form from the peritoneal cavity of the C57Bl/6J mouse. They indicate that the B_{16} melanoma has surface characteristics that direct or facilitate adhesion to lung cells and that these properties are apparently enhanced by in vivo selection. Quantitative measurement of the adhesive properties of B_{16}-F1 and B_{16}-F10 melanoma cells indicated preferential adhesion of the highly metastatic B_{16}-F10 line compared with the weakly metastatic B_{16}-F1 line. Both cell lines adhered specifically over a low background found with tissue culture medium-soaked Falcon dish controls. Although preliminary, these results indicate that the B_{16} melanoma variant cell lines provide a sensitive experimental system in which both organ specificity and adhesive characteristics can be defined for a tumor that undergoes pulmonary metastasis. (8 references)

6432 SPONTANEOUS TUMORS AND COMMON DISEASES IN TWO COLONIES OF SYRIAN HAMSTERS. II. RESPIRATORY TRACT AND DIGESTIVE SYSTEM. (Eng.) Pour, P. (Eppley Inst. for Res. in Cancer and Allied Diseases, Univ. Nebraska Medical Center, 42d St. and Dewey Ave., Omaha, NB 68105); Mohr, U.; Cardesa, A.; Althoff, J.; Kmoch, N. *J Natl Cancer Inst* 56(5): 937-948; 1976.

Data on neoplasms of the respiratory tract and digestive system are presented from a series of laboratory studies of spontaneous tumors and common diseases in two colonies of Syrian hamsters. Spontaneous respiratory tract neoplasms occurred in almost equal frequencies in the two colonies: 3% in the Eppley colony (EC) and 3.6% in the Hannover colony (HC). Neoplasms were in the nasal cavity, trachea, and lungs, and most were benign; however, two adenocarcinomas of the nasal cavity (EC) and one adenocarcinoma of the larynx (HC) were found. The incidence of digestive tract tumors differed markedly from that of the respiratory tract: 7% in the EC and 23% in the HC. Digestive tract tumors accounted for 15% and 41% of all EC and HC tumors, respectively. All EC digestive tract neoplasms were benign and occurred mostly in males; 19 (83%) were forestomach papillomas and the remaining 4 (17%) were liver hemangioendotheliomas (2) and pancreatic duct adenomas (2). In the HC, almost 50% of the digestive tract neoplasms were malignant; these were most frequent in females. These tumors included 19 (42%) intestinal adenocarcinomas, 18 (40%) liver neoplasms (hemangioendotheliomas, cholangiomas, cholangiocarcinomas), 5 (13%) forestomach papillomas, and 2 (4%) gallbladder polyps. Morphologic alterations in the liver resembled the conditions observed after treatment of hamsters with hormones, certain carcinogens, and/or bile or after parasitic infestations. (35 references)

6433 NEOPLASMS OF THE NASAL PASSAGES AND PARANASAL SINUSES IN DOMESTICATED ANIMALS AS REPORTED BY 13 VETERINARY COLLEGES. (Eng.) Madewell, B. R. (Dept. Surgery, Sch. Veterinary Medicine, Univ. California, Davis, CA 95616); Priester, W. A.; Gillette, E. L.; Snyder, S. P. *Am J Vet Res* 37(7) 851-856; 1976.

The epizootiologic aspects of intranasal neoplasm and neoplasms of paranasal sinuses in domestic an mals were reviewed with special attention to the dog. Three hundred multispecies cases of primary neoplasms involving the nasal cavity or paranasal sinuses were found among 12,300 microscopically confirmed neoplasms. Significant numbers were obs in dogs, horses, and cats. Intranasal neoplasms w more frequent than those of the paranasal sinuses dogs and cats. Only cats had a sex difference in occurrence of nasal neoplasms, with a male predil tion. The frequency of neoplasms of the nasal cav and paranasal sinuses increased with age in all species examined. A clear relationship could not established between nose length and the occurrenc of intranasal neoplasms. Of the tumors, 80% were malignant in dogs, 68% in horses, and 91% in cats detailed review of the medical records in a subse of 49 dogs with neoplasms of the nasal passage ar paranasal sinuses revealed major clinical signs c nasal and ocular discharge, facial deformity, and stertorous breathing. The median duration of sig prior to diagnosis was 3 mo, and 95% of the dogs been given treatment prior to definitive diagnosi All 49 tumors were malignant; 27 were classified histologically as carcinomas and 22 were sarcomas Nineteen dogs were treated, by surgery alone or i combination with radiation therapy. Median surviv was 5 mo (mean 6.7 mo). (24 references)

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See also:

* (Rev): 6002, 6012, 6030, 6046, 6050, 6069, 6070, 6100, 6102, 6103, 6104, 6106, 6108, 6113, 6114, 6115, 6116, 6117, 6118, 6119, 6120, 6121, 6122, 6123, 6124, 6127, 6128
* (Chem): 6140, 6143, 6144, 6151, 6152, 6157, 6158, 6164, 6166, 6212
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6491 FORMAL GENETICS OF FANCONI'S ANEMIA. (Eng.) Schroeder, T. M. (Institut fuer Humangenetik der Universitaet, Neuenheimer Feld 328, D-6900 Heidelberg 1, West Germany); Tilgen, D.; Krueger, J.; Vogel, F. *Hum Genet* 32(3): 257-288; 1976.

The formal genetics of Fanconi's anemia was studied in 21 families from different European countries and 69 families from the literature. The result of segregation analysis was compatible with the hypothesis of a simple autosomal recessive mode of inheritance. The number of sporadic cases was not greater than expected. Among the affected siblings in the sibships analyzed, males were somewhat more frequent than females. However, this sex difference was also found among the unaffected siblings and was not statistically significant. Contrary to the literature, there was no clustering of affected members in the sequence of siblings, no maternal age effect, and no preference for higher birth orders. A high intrafamilial correlation for age at onset and (very probably) number and severity of malformations pointed to genetic heterogeneity. Apart from the standard type, an especially mild type with late onset, few malformations, and a relatively benign course seems to exist. Its counterpart is possibly an especially severe type with early onset, many malformations, and a malignant course. (89 references)

6492 GENERAL CHARACTERIZATION OF MORBIDITY OF LEUKEMIAS IN THE KRACOW REGION IN THE YEARS 1951-1958. (Pol.) Janicki, K. (Instytut Medyczyny Wewnetrznei AM, Kracow, Poland). *Folia Med Cracov* 27(2): 125-134, 1975.

The morbidity of various clinical types of leukemias in the Kracow region in the period 1951-1968 was analyzed on the basis of 1,846 cases registered there for the first time. The incidence of leukemias was also investigated in different population groups by age, sex, living environment, and county. General morbidity of leukemias was 4.16 per 100,000 population annually, with males and females showing indices of 4.96 and 3.44, respectively. Urban morbidity of 4.81 annually contrasted with 3.74 for the rural population. Yearly morbidity was 3.29 below age 15 and 2.47 from ages 15 to 44, but 7.94 in individuals aged 45 and older. Annual morbidity figures were 1.89 for acute leukemia, 1.31 for chronic lymphatic leukemia, and 0.95 for chronic myelocytic leukemia. Morbidity rates varied distinctly from county to county. The results suggest differences in the degree of exposure of the various population groups to factors determining leukemic proliferation.

6493 MALIGNANT SOFT TISSUE TUMORS. EPIDEMIOLOGICAL DATA FOR PARAGUAY. (Spa.) Rolon, P. A. (Departamento de Anatomia Patologica, Facultad de Ciencias Medicas, Universidad Nacional de Asuncion, Asuncion, Paraguay). *Arch Invest Med (Mex)* 6(3): 487-496; 1975.

A statistical study of the epidemiology of malignant tumors of the soft tissues in Paraguay betwe 1960 and 1969 is presented. A total of 147 soft tissue tumors were reported in the 10 yr covered, representing an average incidence of 1.41/100,000 population (1.59 in men and 1.24 in women) and 2. of the total number of malignant tumors reported the same period. The distribution by age, evaluat in 5-yr intervals from 0 to more than 85 yr, showe the highest average occurrence (10.33/100,000 popu tion; 17.72 in men and 4.59 in women) in the 75-7 yr group. The distribution by histological type, reported for 115/147 cases, revealed 23 liposarco 26 malignant neurilemmomas, 15 rhabdomyosarcomas, fibrosarcomas, 12 histologically unclassified sarcomas, 4 synovial sarcomas, 4 Kaposi's sarcomas, leiomyosarcomas, 2 alveolar soft part sarcomas, 2 hemangiopericytomas, 2 dermatofibrosarcomas, 1 me chymoma, 3 mesotheliomas, 2 chondrosarcomas and 3 histiocytomas. The 147 tumors were localized to h and neck (21), thorax (9), trunk (40; 22/40 to re peritoneum), upper extremities (20), lower extremities (49; 27/49 to the thigh), scrotum (3), spermatic cord (2), vaginal wall (1) and unknown loca tion (2). (33 references)

6494 CARCINOMA OF PENIS IN PUNJAB. (Eng.) Pr hakar, B. R. (Medical Coll., Amritsar, India); Gupta, S.; Prabhakar, H. *J Indian Med Ass* 66(3): 55-57; 1976.

Cancer of the penis accounted for 7.7% of all mal cancers reported in Punjab, India, from 1956 to 1973. The majority of the cancers occurred in men aged 50-60 yr, involved the glans penis, were fun ing growths, and were epidermoid carcinomas of a moderately differentiated class. The most promina theory as to the etiology of the disease is the retention of smegma among uncircumsized males. Ca of the penis is rare in circumsized men. (12 refe ences)

6495 TUMOR OF THE ENDODERMAL SINUS OF THE TE TICLE IN ADULTS. (Ger.) Schubert, J. (P ologisches Institut der Medizinischen Akademie '' Gustav Carus'' Dresden, DDR-8019 Dresden, Fetsche strasse 74, East Germany); Roschlau, G.; Gorski, *Z Urol* 69(2): 99-102; 1976.

In a 15-yr period 101 testicular tumors in men ov 18 yr of age were treated. Histologically, 50% we seminomas, 20% teratocarcinomas, 25% embryonic ca cinomas, and 5% choriocarcinomas. One 30-yr-old with an unremarkable history presented with a pal able, rapidly proliferating right inguinal mass a severe topical pain. Orchidectomy found a complet necrotic testicle and an epididymis with a high degree of scar tissue. The tumor consisted of a loose network of polymorphic embryonic cells surrounding cavities of various dimensions. Capillar invagination with surrounding tumor cells in the larger cavities presented a glomerular appearance typical of orchioblastoma, or endodermal sinus tu A generalized metastasis was found 9 mo postopera tively. (14 references)

MORPHOLOGICALLY DETECTABLE PRELIMINARY STAGES OF BREAST CARCINOMA. (Ger.) Prechtel, Pathologisches Institut, Universitaet Muenchen, ch, West Germany); Gehm, O. *Oesterr Z Onkol* : 122-125; 1975.

concept of mastopathy and its relation to car- ma was analyzed. Carcinoma can develop either ovo, usually from the smaller ducts, or from aductal epithelial proliferation, usually in large ducts or their smallest termini. Three ees of mastopathy are proposed, as follows: I, gn parenchymal dysplasia without intraductal iferation; II, benign parenchymal dysplasia with aductal proliferation but without cytomorpholog- atypia; III, parenchymal dysplasia with both aductal epithelial proliferation and atypia. I ot be linked with subsequent carcinoma. II and represent 21% and 5%, respectively, of all masto- ies. Histologically, II presents only an unremark- epitheliosis; III shows higher mitotic fre- cies, polarization anomalies, and nuclear varia- s. In a sample population of 400 women 15-45 yr ge, with original histological confirmation of opathy, there was a 20% recurrence of stigmata ll three mastopathy categories in a 5-yr follow- Types I and III rose steadily, while II leveled between 18 and 42 mo before rising sharply there- r up to 48 mo. Histological assay of half the rrences found unilateral localization (mostly in same quadrant) but no evidence of malignancy. (2 erences)

GROWTH RATE AND NATURAL HISTORY OF HUMAN BREAST CANCERS. (Fre.) Tubiana, M. (Insti- Gustave-Roussy, 16 bis, avenue P.- Vaillant- urier, F 94800 Villejuif, France; Chauvel, P.; ud, A.; Malaise, E. P. *Bull Cancer (Paris)* 62(4): 358; 1975.

on the growth rate of human breast cancers and r cell proliferation kinetics are reviewed. st cancers are among those human cancers with longest doubling time and the lowest labeling x. Because there is a high rate of cell mortality hese tumors compared to the more rapidly repro- ng ones of other organs, there is a wide range oubling times (from < 10 to approximately 1,000), with a median around 3.5 mo. From this doubling it appears that the transformation first rs about 2 yr before the tumor can be clinically nstrated. Delay between identification and treat- is not as critical in small tumors as it is in e ones, which suggests that the rate of growth prognostic significance. Regarding survival , it appears that chances of survival are en- ed if there is little or no lymph node in- vement. The probability of metastasis is strongly luenced by the size of the tumor and invasion of lymph node.

3 BREAST CANCER IN INDIA. (Eng.) Jussawalla, D. J. (Dept. Surgery, Tata Memorial Cancer tre, Parel, Bombay 12, India). *GANN Monogr Cancer* (18): 187-193; 1976.

Data for the 6 million people of Greater Bombay from the Bombay Cancer Registry indicate a greater incidence of uterine cervix cancer than breast cancer, which agrees with the data from five other cancer hospitals in the country. This pattern changes when the population is separated according to ethnic group: among the Parsis of Bombay (an economically advanced, inbred community that follows its own social and religious customs) and the Sindhis (Hindu migrants from Sind in Pakistan), there was more breast cancer than cervical cancer. Etiological factors for breast cancer include age, marital status, parity, menstrual status, and previous breast disease. Incidence increases with age, with a plateau around the menopausal years. There is an increased risk in unmarried women, but a decreased risk among parous women, especially those whose first pregnancy was before age 18. There is also a lower risk with artificial menopause, but an enhanced risk in women with a history of breast cancer and fibrocystic breast disease. Another possible factor is the B viruslike particle, which has been found in milk samples taken from normal Parsi women. (3 references)

6499 PSYCHOLOGICAL CORRELATES OF BREAST CANCER. (Eng.) Greer, H. S. *In: Risk Factors in Breast Cancer*. Stoll, B. A., ed. (Chicago: William Heinemann Medical Books Ltd.): New Aspects of Breast Cancer, vol. 2, pp. 71-79; 1976.

A consecutive series of 160 women admitted to the hospital for breast tumor biopsy was studied psychologically by detailed structured interviews and standard tests. Interviews and testing were conducted on the day before operation, without knowledge of the provisional diagnosis. The information was verified by separate interviews with husbands or close relatives. Present results are based on statistical comparisons between 69 patients found to have breast cancer and a control group comprising the remaining 91 patients with benign breast disease. The principal finding was a significant association between the diagnosis of breast cancer and a behavior pattern, persisting throughout adult life, of abnormal release of emotion. This abnormality was extreme suppression of anger and, in patients over 40, extreme suppression of other feelings. Extreme expression of emotions, though much less common, also occurred in a higher proportion of cancer patients than controls. Previous reports of correlations between breast cancer on the one hand, and extraversion, previous emotional stress, and depressive states on the other, were not confirmed. (20 references)

6500 HODGKIN'S DISEASE AND LYMPHOMA. (Eng.) O'Neill, B. (Haematology Dept., Royal North Shore Hosp., St. Leonards, New South Wales 2065, Australia). *Med J Aust* 1(17): 636; 1976.

The incidences of Hodgkin's disease and lymphoma reported in the various regions of the New South Wales health regions since 1972 are presented. Patients with these diseases need constant medical supervision and laboratory tests as well as radiotherapy facilities at some time during their illness. However, in the region with the highest prevalance of these diseases, there is a shortage of medical facilities. These data may relate to recent reports concerning clustering of cancer. (No references)

6501 THE PROBLEM OF MALIGNANT RECURRENT STRUMA.

(Ger.) Halter, A. (Institut fuer Pathologische Anatomie der Universitaet, Schmelzbergstrasse 12, CH-8091 Zurich, Switzerland). *Schweiz Med Wochenschr* 106(7): 210-217; 1976.

A postmortem analysis negates the hypothesis that strumectomy is a predisposing factor in thyroid malignancy. In 29,060 autopsies performed over a 13-yr period, 166 thyroid malignancies were identified. Of the 166, 15 had previously undergone resection for benign nodules. Two of the 15 were eliminated because of suspected nonmalignancy, and the remainder were categorized into four groups based on the findings at strumectomy and their case histories reviewed. Group I (five cases) had a histologically confirmed primary malignancy; group II (one case) had a histologically unconfirmed, but probably strumal malignancy; group III (three cases, histology unavailable), had a subsequent follicular carcinoma; group IV (four cases) had a histologically unconfirmed but probably benign struma, with subsequent malignant recurrence and rapid death. It would appear that strumectomy, or the condition for which it was indicated, is prodromal for subsequent malignancy, an inference seemingly supported by the literature. However, if the unknown or ambiguous histology of the various groups is revised relative to subsequent malignancy, whose invasive and metastatic properties are late-appearing, and reclassified as preinvasive, then 7/13 patients developed frank carcinoma post-strumectomy. This ratio is identical with the probability of accidental occurrence. (19 references)

6502 THYROID NEOPLASMS IN THE KRACOW AREA IN THE YEARS 1967-1973.

(Pol.) Stachuba, J. (Zaklad Patomorfologii Instytutu Patologii AM w Krakowie, ul Grzegorzecka 16, 31-531 Krakow, Poland); Szybinski, Z.; Sznapka, Z.; Drop, R.; Bogacki, W.; Huszno, B.; Bobrowski, A.; Sieradzki, J.; Mruk, K.; Cichon, S.; Korzeniowska, D.; Barylak, H. *Endokrynol Pol* 26(4): 439-445; 1975.

Cancer incidence in the Kracow area during 1967-1973 was investigated on the basis of a histologic study of patients operated on in area clinics and hospitals. Of 189 thyroid neoplasms, 116 were malignant. The majority (95%) of patients with follicular cancer were operated on between ages 20 and 60, whereas 64% of papillary cancers were treated surgically between ages 20 and 40. Among thyroid cancers, papillary cancer was found in the youngest age groups. The longest period of goiter preceding cancer of the thyroid was found in cases of follicular cancer, an indirect confirmation of the connection of this type of neoplasm with the continuing presence of goiter. The findings indicate the persistence of endemic goiter in the Kracow region despite iodine prophylaxis. The fact that papillary cancer was not preceded by long-standing goiter distinguishes it epidemiologically from follicular cancer.

6503 ALCOHOL AND CANCER (Letter to Editor).

(Eng.) Lyon, J. L. (Dept. Family and Community Medicine, Univ. Utah Coll. Medicine, Salt Lake City, UT 84132); Gardner, J. W.; Klauber, M. *Lancet* 1(7971): 1243; 1976.

Data are presented that do not support a recently proposed hypothesis linking alcohol use and cancer of the breast, skin (melanoma), and thyroid. The populations surveyed were Mormons and non-Mormons from Utah, whose per capita alcohol consumption is 50% of the national average. Incidence data are given for these three cancers as well as for esoph geal cancer, which is associated with alcohol use. There was a statistically significant difference i the incidence of esophageal cancer between Mormons and non-Mormons, but not for any of the other cancers. To test the hypothesis further, additional studies are required that control for factors such as social class, tobacco usage, parity, and fertil and that demonstrate a dose-response relationship alcohol use. (3 references)

6504 ESOPHAGEAL CARCINOMA IN BLACKS: ANALYSI OF 88 NECROPSIED CASES.

(Eng.) Sampson, C. (Howard Univ. Hosp. and Coll. Medicine, Washin ton, DC); Braxton, E. L. *J Natl Med Assoc* 68(4): 278-280, 311; 1976.

The records and necropsy files of 88 patients (71 men, 17 women, ages 41-76 yr) dying from esophage carcinoma during the 19-yr period from 1957 to 19 were studied. All of the patients were black, coi ciding with the observation that American blacks show a greater risk of developing esophageal carcinoma than other ethnic groups. All of the carci were of the squamous type, and the histological variations ranged from well- to poorly differenti Seventeen (19.3%) were located in the upper third 41 (46.6%) in the middle third, and 30 (34.1%) in the distal third of the esophagus. Over 85% of th subjects had unskilled occupations, 53.4% were ci arette smokers, and 62.9% were alcohol drinkers. increase in incidence in American blacks appears be correlated with increased alcohol consumption tobacco use. The incidence in American black men risen from 7.5/100,000 in 1947 to 15.1/100,000 in 1969; in contrast, the rate in American white men has decreased from 6.1/100,000 to 4.4/100,000 ove the same period. A similar but less dramatic char has been noted in black and white women. The etic ogy of esophageal carcinoma appears to be multifa toral, with no one entity accounting for all instances of the disease.

6505 PRIMARY LIVER-CELL CARCINOMA IN THE SA NAH COUNTRY OF NORTHERN NIGERIA (Lette Editor).

(Eng.) Edington, G. M. (Faculty Medicine Ahmadu Bello Univ., Zaria, Nigeria); Greenwood, M. *Lancet* 1(7973): 1356-1357; 1976.

Almost nothing is known of the pattern of maligna disease in the northern Savannah country of Nige but the establishment of a medical school and te ing hospitals has allowed ratio frequencies of m tumors to be calculated. In 1970-74, 2,072 rs were diagnosed in 12,422 biopsy specimens; ary liver cell carcinoma (PLCC) occurred in 92 s and 29 females, frequencies of 8.9% and 2.8%, ectively. The overall frequency was 5.8%. From beginning of 1974, PLCC has been diagnosed clin- ly in conjunction with serum α-fetoprotein estima- s. In 1974-75, 65 PLCC's were diagnosed by biopsy 165 by α-fetoprotein estimation and clinical ination. During this period, the frequencies of were 28.5% in males, 9.2% in females, and 20.2% l. This high total frequency indicates an exten- problem in this part of the country. (8 refer- s)

GASTRIC MASS SURVEY. (Eng.) Ariga, K. (Third Dept. Internal Medicine, Nihon . Sch. Medicine, Surugadai 1-8, Chiyoda-ku, o 101, Japan); Takahashi, K. *GANN Monogr Cancer* (18): 99-103; 1976.

e gastric cancer can develop without presenting toms, early detection is a problem. The gastric survey was initiated in Japan in 1956 as a ible solution. National statistics obtained by survey, first collected in 1964, are published ally. The number of persons examined has risen 210,071 in 1964 to 1,886,062 in 1971. In 1971 frequency of detected cases declined to 0.15% a yearly average of 0.2%-0.3%. Of 623 cancers d in 1971, 596 (95.7%) were recommended for ations; the operation rate was 92.3%. Compared cases of gastric cancer detected in Nihon Univer- Hospital, the 5-yr survival rate of those de- ed by the mass survey is 63%, while that for the er is 20.5%. Methods used in the mass survey ude a general procedure and photofluorography. eferences)

MALIGNANT NEOPLASMS OF COLON AND RECTUM IN BERLIN, CAPITAL OF THE G.D.R., 1960-1969. .) Berndt, H. (Zentralinstitut fuer Krebsforschung AdW der DDR, DDR-1115 Berlin-Buch, Lindenberger 80, East Germany); Diertich, D.; Hansche, G.; che, R.; Werner, H.; Witt, K. *Arch Geschwulst- ch* 45(7): 670-684; 1975.

atistical analysis of colon and rectal cancer large urban area for a recent 10-yr period is ented. Colon and rectal carcinomas totaled 2,158 1,695 cases, respectively. The male:female ratio the colon was 784:1,374 and for the rectum 751: both figures representing a war-associated ominance of females (44%:56%). Only 3% were ger than 45 yr, with 37% colon and 39% rectal lvement, respectively, at 65-74 yr and 31% colon 25% rectal involvement, respectively, at 75 yr lder. Most of the patients were in clinical es II or III before therapy. There was no cor- tion between duration of history and stage of ase. Detailed comparisons with other epidemiolog- studies are made. (14 references)

RECENT TRENDS OF LARGE BOWEL CANCER IN JAPAN COMPARED TO UNITED STATES AND ENGLAND WALES. (Eng.) Lee, J. A. (Dept. Epidemiology and International Health, Sch. Public Health and Community Medicine, Univ. Washington, Seattle, WA 98195). *Int J Epidemiol* 5(2): 187-194; 1976.

Mortality and incidence data for colorectal tumors in Japan from 1946 through 1970 were compared with data from the US, England, and Wales. The death rate from these tumors has risen rapidly in Japan since World War II, particularly for those of the colon. The occurrence is similar in men and women and the rise in mortality is greatest among the elderly, possibly because of improvements in death certification. The difference between the Japanese and the US population is substantial at all ages. It is not know whether the current increase in the mortality of Japanese from tumors of the large intestine is due to differences between birth cohorts established early in life or whether the differences developed after the end of World War II. Japanese who die of these tumors are younger than Americans, even when the age distribution of the populations is taken into account. This effect is produced by the differences between cohorts, and the age distributions within cohorts are closely similar in the two populations. Although the male excess is smaller, the sex ratio for rectal tumors rises with age in Japan in the same way that it does in the West, but the sex ratio of colonic tumors is apparently independent of age. (24 references)

6509 A NON-DESTRUCTIVE METHOD FOR MEASURING INTESTINAL CELL TRANSIT TIME. (Eng.) Hagemann, R. E. (Allegheny General Hosp., 320 East North Ave., Pittsburgh, PA 15212); Cooper, J.; Poulakos, L. *Cell Tissue Kinet* 8(4): 391-396; 1975.

The possibility of using the time of radiolabeling of S phase crypt cells as the 'start' time in studies of intestinal cell transit time, and the time of lumenal digestion of these cells as the 'finish' measurement, was investigated in three animal species by external counting of accumulated thyroidal radioactivity. The animals were injected with low doses of ^{125}I-iododeoxyuridine (mice, 3 μCi; rats, 4 μCi; gerbils, 2 μCi) to label newly formed crypt S cells. The thyroid was blocked initially and reversibly for a period less than the cell transit time. External counts were made on unanesthetized animals over the thyroid and over the thigh for a blood background correction. In all three species, loss of intestinal radioactivity by cell loss from the villi was accompanied by a prompt rise in thyroidal activity, and these occurred at the cell transit times determined destructive for each species: 42-46 hr for mice, 38-42 hr for rats, and 120-130 hr for gerbils. These data suggest that a steep rise in thyroid activity occurs at times corresponding approximately to the known intestinal cell transit time in the three species. It is suggested that the mammalian thyroid gland can be used as an in situ biological indicator for determining intestinal cell transit time without requiring tissue sampling. The technique allows estimations of intestinal cell transit time to be made on an individual basis and can be expeditiously applied to large animals. (9 references)

6510 FREQUENCY OF CARCINOMA IN A MEDIUM-SIZED COUNTRY HOSPITAL.

(Ger.) Klasinc, S. (Landeskrankenhaus Fuerstenfeld, A-8280 Fuerstenfeld, Realschulstr. 5, Austria). *Zentralbl Chir* 101(14): 855-862; 1976.

In this statistical survey the values of certain variables are examined in confirmed carcinomas among 216 men and 288 women, over two-thirds of whom were between 60 and 80 yr old. The blood group distribution included 44% A, 16% B, 6% AB, and 34% O. The tumor localizations were gastric (132), rectal (68), colon (63), breast (58), uterine (53), and pancreatic (25); gastric, pancreatic, and uterine tumors were more frequent in group A patients. There were 134 adenocarcinomas, 91 mixed forms, 57 cases of carcinoma solidum, and 34 squamous carcinomas among the 321 reviewed. Surgery was performed on 331, including radical in 116 and palliative in 52; 161/504 were inoperable, a high figure reflecting the relative indifference characteristic of a rural catchment area from which the sample is drawn. Regional or remote metastases were found in 205 cases. (5 references)

6511 CANCER MORTALITY TRENDS IN NAGPUR CITY, 1958-72.

(Eng.) Rao, G. R. (Model Vital Health Statistics Unit, Nagpur-12, India); Shivde, A. V. *Indian J Cancer* 13(1): 1-8; 1976.

The mortality statistics (1958 to 1972) of Nagpur, India, were used to study cancer mortality patterns in the area, believed to be representative of the Central India region; the statistics were also compared to those for other countries. The study population consisted of 3,894 cancer deaths. During the 15-yr period, the average number of cancer deaths per year rose 38% to become the leading cause, while the number of deaths from all causes fell 37%. The cancer mortality rate was 35.1/100,000, 41.7 for males and 27.5 for females. The upward trend in cancer deaths was ascribed partly to population growth, improved detection methods, and increased life span. In either sex, the risk of mortality from cancer increased with age, becoming 241/100,000 in persons over 65 yr. The principal sites in men were the digestive organs and oral cavity (46.4%), lymphatic and hemopoietic tissues and respiratory system (15%), and the genitourinary tract (8.5%). In women, the alimentary system cancers (35%), genitourinary system and breast cancers (30%, leukemias (15%), and respiratory system cancers (3%) were the most prevalent. Discrepancies in national distributions were greatest for stomach cancers, Nagpur 13% and Japan 44%; trachea, bronchus, and lung, Nagpur 8.9% and Wales 39.8%; and breast, Nagpur 13% and Japan 0.03%. Lymphatic and hematopoietic cancers were approximately three times as high in Nagpur (15.9%) as in other countries, except the US (10.5%). (11 references)

6512 CANCER PROBLEM IN BANGLADESH.

(Eng.) Huq, S. F. (Dept. Radiotherapy, Dacca Medical Coll., 52/D, Azimpur Estate, Dacca 5, Bangladesh). *GANN Monogr Cancer Res* (18): 253-257; 1976.

Cancer incidence, site distribution, and medical services in Bangladesh are surveyed. In 1973, ther were 60,000 deaths due to cancer, or 800 deaths p million. The incidence of the following cancers w quite high: stomach, colon, and rectum and primar cancer of the liver. Among 6,791 patients treated only by radiotherapy during 1968-72, oral, laryng pharyngeal, and cervical cancers were the most pr alent. The first two types are probably due to th chewing of betel tobacco quid and a deficient die and the third to the greater numbers of childbirt injuries and cases of cervicitis. The lower incid of lung and breast cancer noted may be related to the population's particular method of smoking and the practice of breast feeding, respectively. Presently there is a lack of properly trained person drugs, and equipment as well as a lack of economi resources to rebuild the country and its health system. (1 reference)

6513 INCIDENCE AND PATTERN OF CANCER IN SRI LANKA.

(Eng.) Nissanga, S. (Government Cancer Inst., Maharagama, 65 Sir Ernest de Silva Mawatha, Colombo 7, Sri Lanka). *GANN Monogr Cance Res* (18): 259-264; 1976.

Statistics on cancer incidence were collected fro provincial hospitals, health divisions, and the Maharagama Cancer Institute (Sri Lanka). There ha been a 90% increase in cancer incidence from 1964 1972. There were great variations in incidence am the 15 health divisions into which the country is divided; the variations may be due to differences preferential use of the indigenous medical system in the type and adequacy of medical facilities av able, and in the recording systems used. Study of the anatomical distribution of cancer revealed a remarkably high incidence of buccal cancer; it wa 31.5% of all cancers in 1972. A detailed study of 306 buccal cancers showed 297 to be squamous carc nomas. Men were affected more than women (63% to 37%), and the buccal mucosa was most often invol (2 references)

6514 CARCINOGENS IN THE HUMAN ENVIRONMENT.

(Eng.) Selikoff, I. J. *In: Advances in Cancer Surgery*. Najarian, J. S.; Delaney, J. P., eds. (New York: Stratton Intercontinental Medica Book Corp.): pp. 41-52; 1976.

Estimates indicate that 60%-95% of human cancer due to environmental causes. Associations have b demonstrated between bladder cancer and aromatic amines, scrotal cancer and chimney ash, lung can and cigarette smoking, and bladder cancer and an dyes. In most cases, there is a long latent peri between onset of exposure to an environmental ca cinogen and first clinical evidence of disease. Prospective cohort studies of asbestos workers h repeatedly shown an excess of deaths due to gast intestinal cancer, mesothelioma, and bronchogeni cancer. The vast increase in lung cancer deaths is found only among cigarette smokers and is due not to smoking or asbestos alone but to the comb tion of these two factors. Cigarette smoking is sociated with increased lung cancer among uranium ners, and occupational exposure to benzene with creased risk of leukemia among survivors of the roshima bombing. Dissemination of asbestos from dustrial sources is also associated with a sig- ficant cancer risk; pleural plaques and mesothel- ma are increased in persons living with asbestos rkers or near asbestos mills, and asbestos bodies e routinely found in lung smears from routine topsies. Potential causes of cancer include the ntamination of Lake Superior by tactonite tailings d the dissemination of vinyl chloride into the neral environment. (No references)

15 LONG-TERM MORTALITY STUDY OF STEELWORKERS. X. MORTALITY PATTERNS AMONG MASONS. (Eng.) ckette, H. E. (Dept. Biostatistics, Graduate Sch. blic Health, Univ. Pittsburgh, Pittsburgh, PA 261); Redmond, C. K. *J Occup Med* 18(8): 541-545; 76.

e cause-specific mortality of masons in the steel dustry was studied. Their mortality experience was mpared with that predicted by the age- and race- ecific death rates for a control group consisting steelworkers whose first job in 1953 was not in e mason department. The nonwhites had an overall cess risk when compared to the nonmason group. s excess was not confined to any particular cate- y and was apparently due to the cumulative effect an excess in many different categories. The white sons had an excess risk for nonmalignant respira- y disease. Furthermore, this risk increased with gth of exposure. The whites had an excess risk respiratory cancer when compared to the nonmason oup. This excess was not present in the later ars of the follow-up period. The interpretation of e findings for cardiovascular disease remain un- ear. (13 references)

6 CANCER AMONG CHEMICAL WORKERS OF A NAPHTHALENE CLEANING PLANT. (Ger.) Wolf, O. O-Klinik des Bezirkskrankenhauses Dessau, 4502 ssau, Auenweg 38, East Germany). *Dtsch Gesundheits-* 31(21): 996-999; 1976.

rief casuistic analysis of 15 workers formerly loyed for up to 30 yr in a now-dismantled naph- lene cleaning facility revealed malignancies in r of five already deceased and in three still ing. Seven, all but one of whom had 18 to 30-yr osures, remained symptom-free. Among the deceased, yngeal carcinoma occurred in two and gastric and on carcinoma in one each. Both laryngeal cancer es had been heavy smokers, with long-term hoarse- s and dyspnea; one presented with an undifferen- ted and one with a stenosing squamous carcinoma, h with paratracheal metastases. A scirrhous, id pyloric mass with metastases characterized the mach involvement, while the colon cancer was oalveolar adenocarcinoma with intrapulmonary astases. Laryngeal cancer occurred in 2/3 affected vivors, each of whom were moderate to heavy kers with a history of hoarseness; one subject esented with lupus erythematodes on a cheek. The seven tumor-free probands were variously afflicted with rhinopharyngolaryngitis, an inflammation conducive to prodromal carcinogenesis. (23 references)

6517 ASBESTOS RELATED DISEASE IN BARROW-IN-FURNESS. (Eng.) Edge, J. R. (High Carley Hosp., Ulverston, Cumbria, Great Britain). *Environ Res* 11(2): 244-247; 1976.

In 1966, the first case of pleural mesothelioma was recognized in Barrow-in-Furness, a town whose major industry is shipbuilding and whose population had been exposed to high concentrations of asbestos before, during, and after World War II. In 1968, a 1-in-10 radiographic survey revealed a prevalence of about 6% of male shipyard workers with pleural plaques. However, later autopsies suggested a higher true prevalence; instead of the expected 400 men with plaques, 579 were found with x-ray changes due to plaques. Since 1966, 28 histologically confirmed cases of pleural mesothelioma have been found. The average time since first exposure to asbestos was 35 yr; the average survival from diagnosis to death was 18 mo. Pleural plaques were seen in the radiographs of 20 patients. A retrospective death certificate study of workers with pleural plaques was also conducted. Those workers with plaques (without evidence of pulmonary fibrosis) had a 2.5 times increased risk of developing carcinoma of the bronchus compared with matched controls. The excess mortality in the plaque group was related to carcinoma and mesothelioma. A study of serological techniques related to circulating antibodies (rheumatoid factor and antinuclear factor) indicated that they are probably not useful for screening for susceptibility to pleural changes after asbestos exposure. (3 references)

6518 CANCER DEATH RATE HIGHER FOR CHEMISTS. (Eng.) Rawls, R. L. (Washington, DC). *Chem Eng News* 54(27): 17; 1976.

Male chemistry graduates of the Royal Institute of Technology in Stockholm, Sweden, from 1930 to 1950 were surveyed. Deaths from cancer, particularly lymphomas, were significantly higher for them than for the general population. Of 58 deaths, 22 were attributed to cancer: 6 of these were due to malignant lymphomas, 3 to Hodgkin's disease, and 3 to cancers of the kidney and bladder. All but one of the cancer deaths occurred in a group that had had several years' occupational exposure to chemicals. Similar results were seen in a study conducted in 1969 of mortality patterns from 1948 to 1967 among members of the American Chemical Society (ACS). However, there was no significant increase in cancers of the bladder and kidneys or of Hodgkin's disease, as found in Sweden. There were no women graduates in the Swedish study, but in the ACS study there were more deaths due to breast cancer than expected; however, they can possibly be explained by economic and culture factors rather than by exposure to chemicals. (No references)

6519 CHEMISTS AND CANCER. (Eng.) Plant, A. F. (Washington, DC). *Chem Eng News* 54(27): 2; 1976.

A Swedish study of chemistry graduates and an American study of chemists indicated that chemists have a significantly higher death rate from cancer than does the general population. In neither study was exposure to chemicals given as a direct cause of the increased incidence, but in the Swedish study it was noted that most of the deaths occurred in the group having several years' occupational exposure to chemicals. Greater awareness and concern with minimization of exposure to chemicals should be maintained in schools and on the job. In addition, the special risk environment of the chemist should be monitored and controlled. (No references)

6520 THE CARCINOEMBRYONIC ANTIGEN IN THE POPULATION OF AN INDUSTRIAL AREA. (Ger.) Schlipkoter, H.-W. (Med. Institut fuer Lufthygiene und Silikoseforschung, Universitaet Dusseldorf, D-4000 Dusseldorf, Gurlittstr. 53, West Germany); Baginski, B. *Zentralbl Bakteriol (Orig B)* 161(4): 295-303; 1976.

Radioimmunoassay of serum carcinoembryonic antigen (CEA) was undertaken in 1,041 males born in 1924 and correlated by questionnaire with tobacco habituation, chronic bronchitis, and occupational environment. The sample population included 520 from a heavily industrialized urban area (A), 132 from a less industrialized middle-sized city (B), and 389 from a rural region (C). The distribution of CEA values followed a normal logarithmic distribution, whose lower limit was taken at approx 1.2 ng/ml. The median from A was significantly higher than that from C. CEA levels above 5 ng/ml were significantly more frequent among smokers than nonsmokers in A, B, and C. Chronic bronchitis, but not silicosis, was also linked to higher CEA, independent of smoking habit. Industrial workers had higher CEA levels than office workers in A, which was especially clear among the nonsmokers. This difference was insignificant in C. The industrial workers in A who smoked also had higher CEA than smokers in C. (30 references)

6521 HEALTH RISKS FROM HIGH ENERGY RADIATION EMANATING FROM NUCLEAR POWER PLANTS. (Ger.) Fritz-Niggli, H. (Strahlenbiologisches Institut, Universitaet Zurich, August-Forel-Str. 7, CH-8029 Zurich, Switzerland). *Soz Praeventivmed* 20(2): 41-47; 1975.

The point is made that energy minima generate maximal effects in autosomal and gonosomal mutation, malformation, and oncogenesis. There is no reference point for determining a nontraumatic radiation dose. The dose-response curve, even at lowest doses, is linear and runs through zero, such that each additional radiation load increases the probability of tissue trauma. The natural mutation rate is very high and would be reinforced by artificial exposure. If the maximum radiation load within 10 km of a nuclear power plant is 5 mrem/yr, or 150 mrem for one generation, the natural mutation rate would increase 1/700. Moreover, at a 5-mrem/yr rate, the increase in cancer incidence would be 0.001 case, assuming whole-body exposure within 10 km of a pla In particular, leukemia morbidity would rise 5-10 cases per billion population above its present inc dence (in Switzerland) of 60,000-70,000 cases per billion. (9 references)

6522 CELL-DIVISION FACTORS FROM *VINCA ROSEA* L CROWN GALL TUMOR TISSUE. (Eng.) Miller, O. (Dept. Plant Science, Indiana Univ., Bloomingto IN 47401). *Proc Natl Acad Sci USA* 72(5): 1883-188 1975.

Ribosyl-trans-zeatin (6-[4-hydroxy-3-methyl-trans-butenylamino]-9-β-D-ribofuranosylpurine) has been isolated from *Vinca rosea* L. crown gall tumor tis by four methods, indicating that it is not an art fact of the isolation procedure. The purified mat ial was examined in a computerized Varian MAT CH- mass spectrophotometer at 70 electron volts and various temperatures and cell division activity w determined by the soybean callus assay. Mercuric acetate did not precipitate synthetic ribosylzeat from solution but did cause a shift of the absorption peak from 268 to 276 nm. Ribosylzeatin was precipitated by mercuric acetate plus sodium carbonate at pH 7.2. The production of ribosylzeatin the tumor tissue accounts for a large portion of activity detected in tumor tissue extracts. It is concluded that this compound isolated from *V. ros* L. crown gall tumor tissue is ribosyl-trans-zeati on the basis of its mass spectrum, UV light absor bency spectra, solubilities, chromatographic migr tion values, and growth activity. These findings support the previous suggestion that the cytokine I described by others may contain ribosyl-trans-z Cytokinesin I was precipitated by mercuric acetat plus sodium carbonate from similar tumor extracts (17 references)

6523 ORAL PAPILLOMAS IN *GENYONEMUS LINEATUS* (WHITE CROAKERS). ETIOLOGICAL CONSIDERATIONS. (Eng.) Phillips, M. L. (Dept. Pathology, Medicine, Univ. Southern California, Los Angeles, 90033); Warner, N. E.; Puffer, H. W. *Prog Exp Tu Res* 20: 108-112; 1976.

6524 OCEAN WASTEWATER DISCHARGE AND TUMORS SOUTHERN CALIFORNIA FLATFISH. (Eng.) M arns, A. J. (Southern California Coastal Water R Project, 1500 East Imperial Highway, El Segundo, 90245); Sherwood, M. J. *Prog Exp Tumor Res* 20: 7 1976.

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STATISTICAL ASSOCIATIONS BETWEEN CANCERS
ATOMICALLY UNRELATED SITES AND SOME EPIDEMIOLOG-
IMPLICATIONS. (Eng.) Schrauzer, G. N. (Dept.
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6533 PRIMARY UPPER SMALL-INTESTINAL LYMPHOMA: A REPORT OF 40 CASES FROM IRAN. (Eng.) Nasr, K. (Nemazee Hosp., Shiraz, Iran); Haghighi, P.; Bakhshandeh, K.; Abadi, P.; Lahimgarzadeh, A. *Am J Dig Dis* 21(4): 313-323; 1976.

6534 CANCER MORTALITY CORRELATION STUDIES. II. REGIONAL ASSOCIATIONS OF MORTALITIES WITH THE CONSUMPTIONS OF FOODS AND OTHER COMMODITIES. (Eng.) Schrauzer, G. N. (Univ. California at San Diego, Revelle Coll., La Jolla, CA 92093). *Med Hypotheses* 2(2): 39-49; 1976.

6535 DIETARY IODINE AND CANCER RISK (Letter to Editor). (Eng.) Stadel, B. V. (Center for Population Res., Contraceptive Evaluation Branch, Natl. Inst. Child Health and Human Development, Bethesda, MD 20014). *Lancet* 2(7989): 807-808; 1976.

6536 LOCALISED OCCURRENCE OF N-NITROSOPYRROLIDINE IN FRIED BACON. (Eng.) Patterson, R. L. (ARC Meat Res. Inst., Langford, Bristol); Taylor, A. A.; Mottram, D. S.; Gough, T. A. *J Sci Food Agric* 27(3): 257-260; 1976.

6537 ON THE CARCINOGENIC POLYCYCLIC AROMATIC HYDROCARBON BENZO(a)PYRENE IN VOLCANO EXHAUSTS. (Eng.) Ilnitsky, A. P. (Dept. Chemical Carcinogenesis, Cancer Res. Centre, Acad. Medical Sciences USSR, Moscow, USSR); Belitsky, G. A.; Shabad, L. M. *Cancer Lett* 1(5): 291-294; 1976.

See also:

* (Rev): 6001, 6002, 6003, 6004, 6005, 6006, 6008, 6011, 6037, 6051, 6054, 6058, 6059, 6060, 6061, 6062, 6063, 6069, 6072, 6082, 6085, 6100, 6101, 6103, 6105, 6106, 6107, 6109, 6110, 6112, 6113
* (Chem): 6149
* (Phys): 6245, 6273
* (Viral): 6325, 6340
* (Immun): 6349
* (Path): 6406, 6425, 6433, 6434, 6460

6538 IMMUNOASSAY OF CALCITONIN IN RAT MEDULLARY THYROID CARCINOMA. (Eng.) Deftos, L. J. (Dept. Medicine, Univ. California at San Diego, San Diego, CA); Boorman, G. A.; Roos, B. A.; Moriguchi, M. *Horm Metab Res* 8(1): 83-84; 1976.

A very sensitive radioimmunoassay has been developed to measure rat calcitonin in rat medullary thyroid carcinomas. This type of tumor is spontaneous and transplantable and resembles human thyroid carcinoma. The tumor was transplanted into WAG/Rij (Wistar-derived) rats, and then portions were excised assayed for calcitonin. The sensitivity of the assay was to 1-2 pg, and it is therefore much more sensitive than the previously reported human calcitonin assay. This animal form of medullary thyroid carcinoma should be useful for the study of the human tumor. (7 references)

6539 CHARACTERIZATION OF MALIGNANCY THROUGH TRANSPLANTATION INTO YOUNG CHICK BLASTODERMS. (Eng.) Mareel, M. (Dept. Experimental Cancerology, Kliniek voor Radiotherapie en Kerngeneeskunde, Akademisch Ziekenhuis, Ghent, Belgium); Vakaet, L.; De Ridder, L. *Adv Tumor Prev Detect Charact* 3: 367-369; 1976.

Transplantation of tumor cells into cultured chick blastoderms is a valuable method for characterizing malignancy. Small fragments of tissues, monolayer cultures, or cell pellets were grafted into gaps in the lower layer of the blastoderm. Only malignant cells inhibited the healing of the gap. Transmission electron microscopic studies are described, and the hypothesis that malignant cells inhibit gap healing by destroying the cells of the lower layer edge is presented. (4 references)

6540 CHARACTERIZATION OF MALIGNANCY IN ORGANOTYPICAL CULTURE. (Eng.) De Ridder, L. (Dept. Experimental Cancerology, Clinic for Radiotherapy and Nuclear Medicine, Akademisch Ziekenhuis, Ghent, Belgium); Mareel, M. *Adv Tumor Prev Detect Charact* 3: 370-373; 1976.

A system to study the invasion of surrounding tissues by malignant and nonmalignant tumors has been devised using 7- to 9-day chick embryo organs in culture. Several malignant and nonmalignant tumors were examined using this system. The tumors grew best on the connective tissue side of the epithelia. The invasive tumors destroyed the connective and other tissues surrounding the implantation site, but the nonmalignant tumors integrated with the connective tissue of the host and did not destroy the connective tissue, basement membrane, or epithelium. Two types of invasions occurred: (a) that of solitary cells and (b) massive invasions of tumor tissue. This system may be useful in determining the mechanisms of tumor invasion. (17 references)

6541 MUCOCILIARY TRACHEAL TRANSPORT RATES IN MAN. (Eng.) Yeates, D. B. (Inst. Environmental Medicine, 550 First Ave., New York, NY 10016); Aspin, N.; Levison, H.; Jones, M. T.; Bryan, A. C
Appl Physiol 39(3): 487-495; 1975.

A new method for measuring mucociliary tracheal
transport was developed based on depositing boli
radioactive microspheres in the large airways of
lung and measuring their rate of movement as they
are transported up the trachea. An aqueous aeroso
containing albumin microspheres labeled with ^{99}mT
is inhaled in such a manner that it is deposited
local concentrations in the large airways. These
boli of microspheres are transported up the trach
and their mucociliary tracheal transport rates ar
measured using a gamma camera. The studies last f
1-6 hr. The total activity deposited in the lungs
about 100-200 μCi attached to about 2 μg of album
microspheres (4 x 10^6 particles). Mucociliary tra
al transport rates were measured in 42 healthy no
smoking adults, 32 men and ten women (23-40 yr ol
To determine the long-term reproducibility of the
transport rates, 22 subjects were retested, 1 wk
15 mo apart. The effects of drugs on the mucocil
tracheal transport rate were also studied, using
parasympatholytic drug, atropine, (0.6-1 mg, iv)
the sympathomimetic drug, Th1165a (2-4 breaths o
aerosol containing 0.2 mg Th1165a/breath). Effec
on mucus transport caused by tobacco smoke were
investigated in nine chronic cigarette smokers,
acute effects were studied in two subjects, one
smoker and the other a nonsmoker. The mean mucoc
ary tracheal transport rate in the normal subjec
appeared to be log normally distributed, with a
geometric mean of 3.6 mm/min and a coefficient o
variation of 75%. The rates were similar for men
women, with each individual having a short-term
coefficient of variation of 25%. The repeat stud
showed that the variation within individuals was
less than between individuals. Atropine decrease
mucociliary tracheal transport rates for at leas
hr, while Th1165a increased the rates. Chronic a
acute smoking did not appreciably change the tra
port rates. It is suggested that the cause of va
tion in transport rates could be due to mucus de
viscosity, or ciliary beat differences. The resu
also suggest that mucociliary activity appears t
active in the trachea of smokers. (34 references

6542 A NEW APPROACH TO DETERMINE CELL-CYCLE
PARAMETERS IN HUMAN LEUKEMIA. (Eng.) D
mer, P. (Institut fuer Haematologie der Gesellsc
fuer Strahlen- und Umweltforschung, Munich, West
Germany); Brinkmann, W. *Adv Biosci* 14: 397-414;
1975.

A method for determining the time of DNA synthes
in individual, morphologically defined cells is
described that is especially suited for human ce
since it is performed in vitro with only one sam
Suspended organ cells or culture cells grown on
slides are first incubated with fluorodeoxyuridi
to block the endogenous synthesis of thymidine m
phosphate. The ^{14}C-thymidine is added, making po
sible an undisturbed DNA synthesis. The amount o
^{14}C-thymidine incorporated into individual cells
determined by quantitative ^{14}C-autoradiography a
measured by incident light microphotometry. The
synthesis rate, which is equivalent to the rate

orporation under these conditions, is then used
alculate the time of synthesis. Application of
method to Chinese hamster cells showed that the
e of DNA synthesis corresponds to a reciprocal
al distribution. Good correlation between the
hmetic mean of the time of DNA synthesis (6.1
and the value obtained with a labeled mitoses
nique (6.4 hr) was observed. The method was used
tudy the cell proliferation kinetics in a 60-yr-
woman with blastic crisis in Philadelphia-nega-
chronic myelocytic leukemia who had not been
ted with cytostatic agents for 22 days prior to
study. The leukemic myeloblasts appeared as a
orm population subjected to regulatory processes
erms of the frequency distribution of the time
NA synthesis. Labeling index and time of syn-
is values indicate that the smaller the leukemic
oblasts, the more the proliferative activity is
eased. Compared with normal myeloblasts, the
uction rate of leukemic myeloblasts is shown to
efinitely raised. (47 references)

**EFFECTS OF THE NUMBER OF CELL DIVISIONS
AND OF ADDED ISOLOGOUS NUCLEIC ACIDS ON
NG OF NORMAL HUMAN FIBROBLASTS IN VITRO.** (Eng.)
gren, J. (Inst. Pathology I, Univ. Goteborg,
en). *Pathol Eur* 10(3): 215-219; 1975.

strains of the same normal human fetal fibro-
t strain were cultured and separated, but in a
on dish, with a common medium in order to study
effects of cell division and of added isologous
eic acids on aging. One sub-strain was forced by
equent transfers to grow slowly, the other was
sferred frequently and grew freely. At intervals,
kinetics of the strains was registered by time-
e photography. Aging in vitro, manifested by
ges of cell kinetics, and the total life span in
o for normal human fibroblasts were found to be
ndent on the number of passed cell divisions,
orting the idea of a progressive decay of the
scription mechanism. The effect of nucleic acid
acts on the aging of the cultures was studied by
g the extract (to give 45 μg DNA/ml medium) at
1st transfer and for 7-14 succeeding transfers.
ucleic acid extract for each strain was obtained
the rest of the same ovum, including the pla-
, by the Zamenhof extraction method. To avoid
of material, RNA was not removed from the ex-
s. Four to 18 transfers after the end of the
ment, the cells still revealed a kinetic pattern
al of much younger normal strains, pointing to
fluence on the genes. The effect is probably
o the DNA of the nucleic acid extract. (38
ences)

**EFFECT OF SERUM ON THE GROWTH OF BALB 3T3
A31 MOUSE FIBROBLASTS AND AN SV40-TRANS-
D DERIVATIVE.** (Eng.) Bartholomew, J. C. (Lab.
cal Biodynamics, Univ. California, Berkeley, CA
); Yokota, H.; Ross, P. *J Cell Physiol* 88(3):
86; 1976.

ffect of serum on the growth properties of
ansformed Balb 3T3 A31 and SV40-transformed
3T3 A31 was studied. The concentration of serum

in the growth medium of nontransformed cells had little effect on the initial population doubling time, but did regulate the cell density at which the population became quiescent in G_1. The doubling time of transformed cells, however, was increased significantly as the concentration of serum was decreased below 4% (from 16 hr at 6% serum to 20 hr at 4%, and 51 hr at 1%). This effect on the growth of transformed cells was seen at serum concentrations so low that nontransformed cells did not complete one population doubling. Flow microfluorometric analysis of these populations indicated that the primary effect of different serum concentrations on the nontransformed cells was to modulate the average residence time in G_1; whereas, all the cell cycle phases of the transformed cells were affected by serum. At saturation densities, the nontransformed cells became quiescent in G_1, but the transformed cells still traversed the cell cycle and their saturation density appeared to be a balance between cell production and cell death occurring primarily in the G_1 phase of the cell cycle. (22 references)

6545 **THE INFLUENCE OF PINEAL ABLATION AND ADMINISTRATION OF MELATONIN ON GROWTH AND SPREAD OF HAMSTER MELANOMA.** (Eng.) El-Domeiri, A. A. (Section Surgical Oncology, Cook County Hosp., 1825 West Harrison St., Chicago, IL 60612); Das Gupta, T. K. *J Surg Oncol* 8(3): 197-205; 1976.

The effects are described of the administration of large doses of exogenous melatonin to intact and pinealectomized 6-wk-old Syrian hamsters. Removal of the pineal organ resulted in increase in the growth of transplanted melanoma. Administration of melatonin, the principal indole found in pineal tissue, to pinealectomized animals abolished this effect. It was concluded that the effect of pinealectomy on tumor growth is due to a lack of endogenous melatonin. Administration of large doses of melatonin (4 mg/day) to intact animals, however, did not influence the rate of tumor growth, indicating that the drug has no direct effect on tumor growth and that the changes produced by melatonin deficiency may be due to a complex reaction involving centers in the hypothalamus and brain stem. Certain morphologic changes were noted in the pineal organs of animals treated with exogenous melatonin. Although the biologic significance of these changes is not clear, study of the electron micrographs indicated that the pinealocytes of the melatonin-treated animals were in a state of increased activity. (17 references)

6546 **THE EXPRESSION OF DIFFERENTIATED FUNCTIONS IN SOMATIC CELL HYBRIDS: RETENTION AND ACTIVATION OF C3 PRODUCTION.** (Eng.) Szpirer, C. (Departement de Biologie Moleculaire, Universite Libre de Bruxelles, B 1640 Rhode St., Genese, Belgium); Szpirer, J.; Wiener, F. *Cell Differ* 5(2): 139-149; 1976.

Induction of the third component of complement (C3) in 1S hepatoma-fibroblast hybrids and the secretion of C3 in hybrids derived from diploid C3-producing cells were determined. Clonal lines of mouse hepatoma cells, BWTG3, and rat hepatoma cells Fa32, which produce C3, were hybridized with A9HT and B82 mouse fibroblasts and rat fibroblast JF1, which do not. Cells were incubated at confluence in the presence of ^{14}C-amino acids for 72 hr and double immunodiffusion tests were made with culture media concentrated by freeze-drying. The amount of mouse or rat C3 secreted by the hybrid clones was estimated by testing serial twofold dilutions of the concentrated culture media, using a corresponding adsorbed anti-C3. All interspecific hybrids actively secreted both mouse and rat C3, indicating that the production of C3 coded by hepatoma cell genomes was retained and that secretion of C3 coded by fibroblast genomes was activated. Intraspecific hybrids isolated from normal diploid cells from adult mouse liver, a source of C3, and A9HT cells also retained the capacity to secrete C3. Thus, retention of C3 production does not appear to be peculiar to hybrids derived from hepatoma cells. Hybrids derived from spontaneous in vivo fusion of mouse ascites tumor cells and host produced C3, confirming that C3 secretion is retained by hybrid cells. (34 references)

6547 FURTHER IN VITRO STUDIES ON THE BIOCHEMISTRY OF THE INHIBITION OF NUCLEIC ACID AND PROTEIN SYNTHESIS INDUCED BY ARSENIC. (Eng.) Baron, D. (Institut fuer Biologie II der Universitaet Freiburg i. Br., D-7800 Freiburg i. Br., Schanzleweg 9-11, West Germany); Kunick, I.; Frischmuth, I.; Petres, J. *Arch Dermatol Res* 253(1): 15-22; 1975.

Human lymphocytes, stimulated by phytohemagglutinin (PHA) and exposed to increasing Na_2HAsO_4 concentrations, showed an identical incorporation rate for ^{14}C-thymidine and ^{14}C-thymidine triphosphate (TTP) into DNA. ^{14}C-uridine was incorporated 3%-4% less at an As concentration of 1.0 μg/ml medium; above this, however, it was incorporated approximately 15% less into RNA compared to ^{14}C-uridine triphosphate (UTP). In free pyrimidine bases, the incorporation of labeled triphosphates into DNA and RNA was significantly reduced above 1 and 10 μg Na_2NAsO_4. Corresponding to its approximately uniform distribution into DNA and RNA, the incorporation rate of ^{14}C-ATP above 10 μg Na_2HAsO_4/ml culture medium lay between that of ^{14}C-UTP and ^{14}C-TTP. The incorporation of ^{14}C-alanine and ^{14}C-leucine into cellular protein was not reduced below 10 μg Na_2HAsO_4/ml. The incorporation rate was 41% at a concentration of 100 μg. Compared to ^{14}C-UTP, ^{14}C-ATP, and ^{14}C-TTP it was increased by a factor of 1.8, 2.5, and 6.8, respectively. The inhibition of enzymes of the dark repair mechanisms and the synthesis of biopolymers together with their altered sequence and the involvement of long-lived messenger RNA may explain the alterations of lymphocyte metabolism caused by arsenic. (39 references)

6548 RADIOLABELING OF MAMMALIAN CELLS IN TISSUE CULTURE BY USE OF ACETIC ANHYDRIDE: POTENTIAL VALUE FOR STUDYING THE DYNAMICS OF PROTEIN TURNOVER IN LIVING CELLS. (Eng.) Roberts, R. M. (J. Hillis Miller Health Center, Univ. Florida, Gainesville, FL 32610); Yuan, B. O. C. *Arch Biochem Biophys* 171(1): 226-233; 1975.

The possibility of studying the dynamics of proteins in living cells by using trace quantities of radioactive acetic anhydride to label polypeptides was investigated in Chinese hamster ovary cells and in human skin fibroblasts. The Chinese hamster ovary cells were maintained in a nonproli erating state by using medium lacking L-isoleucin Cells in monolayer culture were treated with 0.01 0.1 ml radioactive acetic anhydride dissolved in benzene or dimethylsulfoxide for 5 min. The cytoplasmic proteins from these cells were isolated the supernatant fraction remaining after centrifu ing the total cell homogenate at 100,000 x g for hr. Trichloroacetic acid was added, and the prec itated proteins were collected by centrifugation The pelleted material was dissolved in sodium do sulfate, boiled for 3 min, and dialyzed for 16 h against 1 l of 0.1% sodium dodecyl sulfate and 0 mercaptoethanol. The proteins in the plasma memb and in the 100,000 g supernatant fraction were s arated by electrophoresis in polyacrylamide gels containing sodium dodecyl sulfate. The radiolabe was rapidly introduced into both the plasma memb and intracellular components, all of which reach similar specific radioactivities. The cells show no measurable loss in viability. The incorporate label was recovered predominantly in the form of acetyl groups on proteins. Since tyrosyl hydroxy were not extensively acetylated, it is assumed t substitution occurred mainly on amino groups. Th was no indication that the acetyl groups once in duced were labile or that the modified proteins discriminated against by the cells. Nor was the any evidence for reutilization of labeled aceta following protein turnover in nonproliferating Acetylation could provide an ideal means for in ducing a very short pulse of radioactivity into proteins of living cells. The method should be tremely useful for studying processes such as e induction and protein turnover where the proble amino acid reutilization has been recognized as possible basis for artifacts. (29 references)

6549 DEMETHYLCHLORTETRACYCLINE-BINDING PRO IN UNINVOLVED GASTRIC MUCOSA OF GASTR CARCINOMA AND GASTRIC ULCER PATIENTS. DEMONSTRA OF A DIFFERENCE BETWEEN THE UNINVOLVED MUCOSA O ULCER AND CANCER PATIENTS. (Eng.) Lo, E. (Dept. Medicine, Univ. Sydney at Royal North Shore Hos Sydney, St. Leonards, NSW, Australia); Thornton Orwell, R. L.; Piper, D. W. *Digestion* 14(2): 11 126; 1976.

The ability of the uninvolved gastric mucosa f patients with gastric ulcer (seven) or gastric carcinoma (seven) to bind demethylchlortetracy (DMCT) was determined by dialysis and by elect sis of DMCT-labeled proteins and carbohydrates. Binding was significantly higher in tissue hom nates from the cancer patients compared with u patients, as determined by exhaustive dialysis. Total binding capacity, measured by equilibriu dialysis, was similar in both groups. Scans of fluorescence on cellulose acetate electrophero showed a peak of free, unreacted DMCT that mig 85% of the distance migrated by albumin; sever

re slowly moving bands of fluorescence were also
served. DMCT altered the electrophoretic pattern
homogenates, as evidenced by the relative propor-
ons of various bands of protein- and carbohydrate-
aining material within the respective scans. Some
otein fractions reacted more readily with DMCT
an others; these labeled components were abnormal
the uninvolved mucosa of cancer patients. The
ssue that gave rise to the carcinoma tended to
nd DMCT excessively when compared with control
ssue. The excessive binding was confined to the
ssue components and possibly reflects the tissue's
vivo ability to retain DMCT after it has been
thdrawn. (28 references)

50 SUBCELLULAR DISTRIBUTION OF DNA-BINDING
PROTEINS FROM CULTURED HAMSTER FIBROBLASTS.
g.) Melero, J. A. (Centro de Biologia Molecular,
.S.I.C.-U.A.M.--Velazquez 144, Madrid-6, Spain);
as, J.; Salas, M. L. *Biochim Biophys Acta* 437(2):
-476; 1976.

distribution between the nuclei and cytoplasm
DNA-binding proteins from growing NIL hamster
ls was studied. To obtain the subcellular
ctions, cell monolayers or cells previously de-
hed from the culture dish were treated with the
ionic detergent Nonidet P-40. Proteins with af-
ity for DNA were isolated from nuclear or cyto-
smic fractions by chromatography on DNA-cellulose
umns and were further analyzed by polyacrylamide
electrophoresis in the presence of sodium dodecyl
fate. P8, one of the major components in the 0.15
aCl-eluted proteins, was found predominantly in
cytoplasmic fractions, whereas P6, the other
n protein peak in this eluate, was more prominent
the nuclear fraction. Among the other proteins,
and P5' were detected in both the nuclear and
oplasmic fractions. All the others were present
ost exclusively in the cytoplasmic fraction. In
trast, most of the proteins with higher affinity
DNA, eluted from the column at 2 M NaCl, were
sent in the nuclear fraction, although they were
o detected in the cytoplasm in amounts similar to
se observed in the nuclei. (23 references)

1 DNA BIOSYNTHESIS IN RAT LIVER MITOCHONDRIA:
INHIBITION BY SULFHYDRYL COMPOUNDS AND
ULATION BY CYTOPLASMIC PROTEINS. (Eng.) D'Agos-
, M. A. (Jefferson Medical Coll., Thomas Jeffer-
Univ., Philadelphia, PA); Lowry, K. M.; Kalf, G.
rch Biochem Biophys* 166(2): 400-416; 1975.

incorporation of [^{3}H]dTTP and [^{3}H]dATP into rat
r mitochondrial DNA and the stimulation of incor-
tion by protein factors were measured in order
xamine the effects of sulfhydryl compounds on
chondrial DNA synthesis. The in vitro incorpora-
of [^{3}H]dTTP and [^{3}H]dATP into Wistar rat liver
chondrial DNA was inhibited by the sulfhydryl
ounds 2-mercaptoethanol, cysteine, glutathione
dithiothreitol but not by ethanol, n-propanol,
ine or methionine. The inhibition did not require
the inner mitochondrial membrane be intact, nor
it result from an effect of the thiol group on
the outer membrane. ATP formation, mitochondrial respiration and DNA precursor permeability were not altered by the sulfhydryl compounds. Glutathione and 2-mercaptoethanol also inhibited the incorporation of [^{3}H]dTMP into membrane-DNA-RNA complex isolated from Sarkosyl lysates of inner-membrane-matrix preparations of mitochondria. DNA polymerase activity was not inhibited by the thiol compounds when DNA polymerase was removed from the inner mitochondrial membrane. Crude cytoplasmic extracts from actively proliferating tissues reversed the inhibition of label incorporation by 2-mercaptoethanol, whereas extracts from normal tissue do not. Partial purification of the cytoplasmic extracts obtained from: Walker R256 mammary carcinoma, Morris hepatomas 7777 and 7800 (rats), 6C3HED Gardner lymphosarcoma (mice) and 22-hr regenerating rat liver was performed using DNA-cellulose affinity chromatography. The partially purified protein(s) stimulated the synthesis of mitochondrial DNA in vitro, and partially reversed 2-mercaptoethanol inhibition of mitochondrial DNA synthesis. The results indicate that the stimulatory proteins found may play a role in the regulation of mitochondrial DNA synthesis. (42 references)

6552 THE DETECTION OF ABERRANT DNA SYNTHESIS IN A MEMBER OF A HIGH-RISK CANCER FAMILY. (Eng.) Deschner, E. E. (Memorial Hosp. for Cancer and Allied Diseases, New York, NY); Long, F. C.; Katz, S. *Am J Dig Dis* 20(5): 418-424; 1975.

Relatives of patients with multiple polyposis are at high risk for development of neoplasms in the colon. Four siblings (three male, one female) of a patient with multiple polyposis were examined for the possible presence of colonic polyps. All patients were over 40 yr of age and had a pedigree involving cancer. All received barium enemas for the radiological detection of excrescences. Protoscopic examinations were also carried out, during which time a biopsy and colonic wash were obtained. Polyps were absent on films as well as on endoscopy, and colonic cytologies of all four subjects were within normal limits. However, isotopic incorporation studies revealed the presence in one family member of an abnormal labeling pattern in some crypts of the biopsy incubated for 1 hr with ^{3}H-thymidine. Along with normal crypts with label in the lower 2/3 of the colonic crypts, some were seen to have cells labeled at the surface, a proliferative lesion thought to precede the appearance of a polyp. Among the surface cells removed by the colonic wash, some were found to be isotopically labeled, that is, engaged in DNA synthesis. Thus, a defect in the regulation of colonic epithelial cell replication was found, suggesting the need for close surveillance in the interest of early colon cancer detection. (13 references)

6553 STRUCTURAL AND METABOLIC CHARACTERIZATION OF RNAS FROM RATS WITH EXPERIMENTAL GUERIN TUMOR. I. NUCLEOTIDE COMPOSITION OF RNAS FROM THE LIVER AND TUMOR TISSUES OF RATS. (Eng.) Ratkiewicz, A. (Inst. Physiology and Biochemistry, Medical Acad., Bialystok, Poland); Galasinski, W. *Neoplasma* 23(1): 77-83; 1976.

The effects of Guerin tumor development on the structure of the RNAs in the liver of tumor-bearing rats were studied. Different nucleotide compositions were observed in RNAs isolated from the liver of normal and tumor-bearing rats and from tumor tissues. The RNAs from tumor subcellular fractions were less heterogeneous than those from normal liver and liver from tumor-bearing rats. The differences observed in the amounts of the various nucleotides in the tissues studied are discussed. The results show changes in the primary structure of liver RNAs due to tumor development. These changes may be the result of metabolic peculiarities of the RNAs themselves. (17 references)

6554 STRUCTURAL AND METABOLIC CHARACTERIZATION OF RNAS FROM RATS WITH EXPERIMENTAL GUERIN TUMOR. II. METABOLIC PECULIARITIES OF RNAS FROM THE LIVER AND TUMOR TISSUES OF RATS. (Eng.) Ratkiewicz, A. (Inst. Physiology and Biochemistry, Medical Acad., Bialystok, Poland); Galasinski, W. *Neoplasma* 23(1): 85-94; 1976.

The metabolism of RNA in Guerin tumor tissue and the effect of tumor development on RNA metabolism in subcellular fractions of rat liver are described. The incorporation of ^{14}C-orotic acid into the nuclear RNA of livers from tumor-bearing rats is slower than that into normal rats. The incorporation into the RNA of tumor tissue is much lower than that of the liver. The turnover rates of nuclear RNAs demonstrate metabolic heterogeneity. The synthesis of cytidine triphosphate from uridine triphosphate is slower in tumor tissue than in liver. Orotic acid is incorporated much later into mitochondrial RNA than into nuclear RNA, and the incorporation into RNA in tumor tissue mitochondria was much lower than that into liver mitochondria. A considerable lag is present for the incorporation of orotic acid into the RNA of the postmitochondrial fractions. The differences in incorporation into RNA from tumor and normal postmitochondrial fractions are discussed. Further studies of the metabolic pathways in tumor cells and in the cells of other tissues of animals with a Guerin tumor are suggested. (11 references)

6555 STABILIZATION OF AN RNA MOLECULE BY 3'-TERMINAL POLY(A)-INDUCED INHIBITION OF RNase ACTIVITY. (Eng.) Hieter, P. H. (Enzymology and Drug Metabolism Section, Lab. Pharmacology, Baltimore Cancer Res. Center, 3100 Wyman Park Drive, Baltimore, MD 21211); LeGendre, S. M.; Levy, C. C. *J Biol Chem* 251(11): 3287-3293; 1976.

The inhibitory properties of poly(A) on human spleen ribonuclease were investigated to gain a better understanding of these polynucleotide sequences associated with messenger RNA, eukaryotic heterogeneous nuclear RNA, and several virus RNAs. Hydrolytic activity was shown to be strongly inhibited by poly(A) contained within RNAs isolated from a variety of natural sources. Furthermore, poly(A) segments of varying length were covalently linked at the 3' terminus of *Escherichia coli* 5 S ribosomal RNA (rRNA) by exogenous polynucleotide phosphorylase, demonstrating an in vitro stabilization of the RNA that
contains poly(A). The extent to which these poly(A
tracts, varying from 4 to 132 nucleotides in lengt
could inhibit endonucleolytic attack on the 5 S rR
to which they are linked depended on their length
and on small changes in spermidine concentration.
It is suggested that the poly(A) at the 3' terminu
of an RNA molecule modulates RNase activity and ma
thereby, in concert with other factors, acts to st
bilize the RNA. (37 references)

6556 ELEVATED SERUM RIBONUCLEASE IN PATIENTS
WITH PANCREATIC CANCER. (Eng.) Reddi, K.
K. (Dept. Neoplastic Diseases, Mount Sinai Sch.
Medicine, New York, NY 10029); Holland, J. F. *Proc*
Natl Acad Sci USA 73(7): 2308-2310; 1976.

Serum ribonuclease (RNase) of normal persons and
patients with pancreatitis, pancreatic cancer, or
other neoplasms was determined with poly(C) as su
strate. Strikingly abnormal elevations occurred i
the serum RNase of patients with pancreatic cance
There was no elevation in the serum RNase level o
patients with pancreatitis. The average serum RNa
value for 52 normal persons was 104 units/ml of
serum. In the patient group, average values in un
ml of serum were 120 for pancreatitis (10 patient
383 for pancreatic cancer (30), 131 for breast ca
cer (28), 173 for lung cancer (11), 197 for colon
cancer (20), 194 for stomach cancer (6), and 152
liver cancer (4). Ninety per cent of the patients
with pancreatic cancer were above the level of 25
units/ml of serum, and 90% of all patients with
varied cancers were below this level. Marked elev
tion of serum RNase was also observed in the pres
of severe renal insufficiency. Because of its uni
specificity, pancreatic origin, and abnormal elev
tion in the sera of patients with pancreatic canc
serum RNase serves as a reliable biochemical mark
of pancreatic cancer in the presence of normal r
function. (8 references)

6557 FREE AND TEMPLATE-BOUND RNA POLYMERASE
NORMAL AND LEUKAEMIC HUMAN LYMPHOCYTES
DIFFERENCES IN INHIBITION BY RIFAMYCIN AF/013 AN
α-AMANITINE. (Ger.) Garbrecht, M. (II. Medizinis
Klinik der Universitaet, Martinistr. 52, D-2000
burg 20, West Germany); Mertelsmann, R. *Klin Woc*
schr 54(5): 235-237; 1976.

RNA polymerase B, which is responsible for the
synthesis of messenger RNA or its precursors, oc
in free (inactive) and bound (active) forms in t
nucleus. Discrimination of the two functional ty
in normal and chronic lymphocytic leukemic (CLL)
human lymphocytes is reported. The free, transcr
tively inactive form in CLL has an activity equi
to 0.133 pmol of tritiated uridine monophosphate
million cells, or 0.76 pmol lower than that for
normal lymphocytes. The bound forms in CLL and r
mal cells are roughly equivalent. Rifamycin AF/
at 400 ng/ml concentrations completely inhibits
free form and partially inhibits (30%-40%) the
form in both normal and CLL cells. Both enzyme
are 50% inhibited in normal cells by 0.01 μg/ml

nanitine, as is the bound form in CLL. The free
in CLL requires 1.0 µg/ml for 50% inhibition,
ch might indicate the involvement of RNA polymer-
C in CLL. (10 references)

CELL CYCLE-SPECIFIC ACTIVITY OF TYPE I AND
TYPE II CYCLIC ADENOSINE 3':5'-MONOPHOS-
E-DEPENDENT PROTEIN KINASES IN CHINESE HAMSTER
Y CELLS. (Eng.) Costa, M. (Depts. Pharmacology,
Radiology, Div. Radiation Oncology, Univ. Arizona
. Medicine, Tucson, AZ 85724); Gerner, E. W.;
ell, D. H. *J Biol Chem* 251(11): 3313-3319; 1976.

s I and II cAMP-dependent protein kinases were
ied during the Chinese hamster ovary cell cycle.
y cells were synchronized by the selective detach-
of mitotic cells from monolayer cultures. Pro-
kinases were separated by DEAE-cellulose chroma-
aphy; they were similar to the types of cAMP-
ndent protein kinases studied in skeletal muscle
in heart extracts. The total amount of protein
se activity per cell was substantial, both in
sis and at the G_1/S boundary. During mitosis,
relatively high activity of protein kinase was
o a predominance of type I protein kinase.
g early G_1, the activity of type I protein
se decreased and there was little type II ac-
y. A rapid increase in the activity of type II
evident at the G_1/S boundary. The administration
romycin (50 µg/ml) 1 to 5 hr after selective
hment of mitotic cells abolished the type II
in kinase activity seen at the G_1/S border, but
o observable effect on type I activity. The
presented demonstrate cell-specific activity
rns of type I and II protein kinase. Type I
ity is high in mitosis and is constant through-
he cell cycle. Increased type II activity seems
related to the initiation of DNA synthesis in
phase. The data suggest a translational con-
of type II cAMP-dependent protein kinase activ-
(27 references)

PRESENCE OF FETAL ALDOLASE C IN SOME INTES-
TINAL TUMORS. (Eng.) Banroques, J. (Insti-
e Pathologie Moleculaire, Groupe 129 de l'INSERM,
atorie Associe au CNRS, Paris, France); Martin,
; Hatzfeld, A.; Schapira, F. *Adv Tumor Prev*
t Charact 3: 319-394; 1976.

uthors have compared the aldolase isozymes of
mall intestine in adult and fetal rats and in
with duodenal adenocarcinomas. The tumors were
ed by administration of N-methyl-N'-nitro-N-
soguanidine to inbred Lewis rats and transmitted
injection. The tumors maintained their morpho-
l characteristics. The aldolase in the adult
ine is almost exclusively aldolase B. The
intestine shows hybridized aldolases A and C.
nocarcinoma aldolase B has disappeared and is
ed by A and C. Immunological results confirmed
results. It seems that the resurgence of iso-
in cancerous tissues is a widespread phenomenon,
gh its mechanism is not yet known. (14 refer-

6560 CLINICAL SIGNIFICANCE OF LDH ISOENZYMES ON EXTRACTS FROM NORMAL AND MALIGNANT TISSUE OF GI-TRACT. (Eng.) Perez-Cuadrado, S. (Dept. Immunopathology, N.C.I., Madrid, Spain); Carda-Abella, P.; Mate-Jimenez, J. *Adv Tumor Prev Detect Charact* 3: 395-404; 1976.

Polyacrylamide gel disk electrophoresis of buffer extracts from human normal and malignant tissues of the gastrointestinal (GI) tract was used to quantitate each of the five lactate dehydrogenase (LDH) isoenzymes in 45 normal (controls) and 63 malignant tissue extracts. Statistical analysis of the data showed highly significant differences between the relative mean values of the subunits M-LDH/H-LDH from normal and malignant GI tract lesions (stomach and colon). There were also significant differences between the relative mean values of LDH-V in normal and malignant tissues. Values for the controls, in particular, clustered well around the mean, with a low coefficient of variation. There were also statistically significant differences between the M-LDH/H-LDH values in the mucosa of the fundus from controls and the normal-appearing mucosa of the fundus (border of excision) from patients with gastric adenocarcinoma. Similar results were obtained with LDH-V values in controls (mucosa from the fundus) versus the normal-appearing mucosa of the fundus (borders of excision) from gastric carcinoma specimens. Patients with colloid carcinoma of the colon showed a significantly higher mean M-LDH value than patients with other types of adenocarcinomas of the colon. Intestinalized antral mucosa did not show a significant increase of M-LDH over controls; however, it did show a significantly higher value of LDH-V. It is suggested that the higher mean values of M-LDH and LDH-V in the normal-appearing mucosa from the fundus of the stomach of patients with gastric carcinoma relative to controls reflect a change at the molecular level induced by neoplastic growth that precedes any detectable morphological and ultrastructural cell changes. (12 references)

6561 ISOENZYMATIC SPECTRUM OF LACTIC DEHYDROGENASE IN SPONTANEOUS TUMORS OF THE MAMMARY GLANDS AND LUNG METASTASES. (Rus.) Tereshchenko, I. P. (Moscow P. A. Gertsen Oncological Res. Inst., Moscow, USSR); Boikova, V. I.; Zaretskaia, I. S. *Biull Eksp Biol Med* 80(12): 76-78; 1975.

Spontaneous mammary gland cancer in mature female C3H mice was used as a model to study the isoenzyme spectrum of lactate dehydrogenase (LDH) in primary tumors and metastases as well as in tissues of the organ in which the metastases appeared. The isoenzyme spectrum of LDH was determined by a modification of the Wieme method. The isoenzyme spectrum of LDH in the mammary glands of intact animals was characterized by a predominance of cathode fractions, expecially LDH_5, which was due to the intensive synthesis of M-subunits. An increase in the synthesis of M-subunits and a decrease in the activity of anode fractions were observed in mammary gland tumors. In mice affected by the metastatic process, a sharp decrease in LDH_1, and sometimes its total absence, characterized the isoenzyme spectrum of the primary tumor focus. A tendency toward further increase in the synthesis of M-subunits was seen in the tumors and in unaffected mammary glands. The isoenzyme spectrum of metastases as compared with the primary tumor was distinguished by the greater activity of anode fractions. In intact mice, the isoenzyme spectrum of LDH in the lungs was characterized by high LDH$_5$ activity and a significant increase in LDH$_3$. The emergence of metastases in the lungs caused a significant reduction in LDH$_3$ activity and an expressed cathode shift.

6562 BIOCHEMICAL BASIS OF MALIGNANCY IN MAN.

(Eng.) Weber, G. (Lab. Experimental Oncology, Indiana Univ. Sch. Medicine, Indianapolis, IN); Malt, R. A.; Glover, J. L.; Williams, J. C.; Prajda, N.; Waggoner, C. D. *Adv Tumour Prev Detect Charact* 3: 60-72; 1976.

The aldolase isozymes of the small intestine in adult and fetal rats and in rats with duodenal adenocarcinomas were compared. The tumors were hydrate, pentose phosphate, purine, and DNA metabolism in rat and human liver were compared. The key activities were essentially in the same order of magnitude in both species. The morphology, clinical history, and biochemistry were examined in four hepatocellular carcinomas in man, and the biochemical results were compared to histologically normal liver. The metabolic studies revealed that the biochemical strategy of the cancer cell in human hepatomas exhibits the same pattern as that observed in transplantable hepatomas in the rat. The enzyme activities involved in channeling precursors to pentose phosphate biosynthesis (glucose 6-phosphate dehydrogenase, and transaldolase), to de novo purine biosynthesis (glutamine phosphoribosylpyrophosphate amidotransferase), and to de novo DNA and RNA biosynthesis (uridine diphosphate kinase) were increased in all human hepatomas, as was the case in all rodent hepatomas. Thus, these changes in gene expression may indicate transformation-linked alterations. All other enzymes studied also behave similarly in the human liver to the pattern observed in rodent tumors, with the exception of glucokinase. Thus, the enzymes of glycolysis were increased; those of gluconeogenesis were decreased. The ratio of thymidine utilization favored the synthetic channeling of this precursor instead of degradative use. In contrast, the key enzyme of the urea cycle was markedly decreased. Glucokinase decreased in rodent hepatomas but increased in human liver tumors. The reprogramming of gene expression detected in human hepatomas by examination of the phenotypic expression in terms of key enzymes and isozymes indicates the operation of an increased potential for glycolysis and for routing the biosynthetic precursors into pentose phosphate, purine, primidine, DNA, and RNA synthesis. In contrast, the capacity for gluconeogenesis and for the urea cycle was decreased. These alterations in gene expression should confer selective advantages for the cancer cells. (13 references)

6563 ABNORMAL NEUTROPHILS IN ACUTE MYELOGENOU
LEUKEMIA: IDENTIFICATION OF SUBPOPULATI
BASED ON ANALYSIS OF AZUROPHIL AND SPECIFIC GRANU

(Eng.) Bainton, D. F. (Dept. Pathology, Univ. Cali
fornia Sch. Medicine, San Francisco, CA). *Blood
Cells* 1(1): 191-199; 1976.

Electron microscopy and peroxidase cytochemistry
have permitted the identification of at least thr
abnormal subgroups of peroxidase-negative and per
idase-positive multilobulated neutrophils (PMN) i
patients with acute myelogenous leukemia (AML). T
mature PMN contains a mixture of specific granule
peroxidase-negative, and azurophilic granules, pe
idase-positive. Specific granules become more num
ous during myelocyte differentiation. Three subgr
of abnormal neutrophils were found in patients w
AML: (1) PMN containing only azurophil granules,
PMN containing only specific granules, and (3) PM
containing both types of granules but with azurop
granules lacking the peroxidase enzyme. In all bu
one case these abnormal cells were mixed with a
minority population of normal neutrophils. It is
speculated that cytotoxic therapy may be contraindicated in cases of AML when no normal PMN can
identified. The literature reveals that although
homogeneous but abnormal population of PMN can be
present in nonmalignant disease states, heteroge
populations, normal and abnormal, are strongly s
gestive of a malignant process. The risk of leukemic patients contracting infection may depend
on the quality of the neutrophils. The fact that
PMN can lack an antibacterial enzyme, such as
peroxidase, or even an entire granule population
suggests that these abnormal subpopulations may
fail to kill and digest pathogens. (20 reference

6564 INSULIN BINDING OF ACUTE LYMPHOCYTIC L
KEMIA CELLS.

(Eng.) Esber, E. C. (Chil
Hosp. Natl. Medical Center, 2125 13th St., N. W.
Washington, DC 20009); Buell, D. N.; Leikin, S.
Blood 48(1): 33-39; 1976.

T and B cell surface receptor and ^{125}I-insulin
binding studies were performed on the bone marr
and peripheral blood leukocytes of 13 children
active acute lymphocytic leukemia. Based on sur
receptors, nine patients had null-cell disease
four had T cell disease. The mean insulin bindi
the bone marrow cells was 10.0% from the null-c
patients and 0.18% from the T cell patients. Th
mean insulin binding of the cell suspensions of
peripheral blood was 7.3% from the null-cell pa
and 0.07% from the T cell patients. Displacemen
studies with nonradioactive insulin indicated t
null leukemic cells bore specific binding sites
There may be metabolic as well as surface membr
heterogeneity among the acute lymphocytic leuke
of childhood. (20 references)

6565 PRESENCE OF TSH RECEPTOR IN THYROID
PLASMS.

(Eng.) Ichikawa, Y. (Dept. Me
Sch. Medicine, Keio Univ., Tokyo, Japan); Saito

Y.; Homma, M.; Muraki, T.; Ito, K. *J Clin Endo-*
ol Metab 42(2): 395-398; 1976.

nature of the thyroid-stimulating hormone (TSH)
ptor in adenoma and carcinoma of the thyroid
d was studied with a radioreceptor assay tech-
e. A membrane fraction of tissue homogenate was
ined by discontinuous sucrose gradient ultracen-
ugation, and ^{125}I-TSH, labeled by a lactoper-
ase method, was purified with a receptor adsorp-
method. Both the capacities and the association
tants of high-affinity receptors (4 x 10^{9} M^{-1})
of low-affinity receptors (0.073 x 10^{9} M^{-1}) ob-
ed in the normal thyroid were almost identical
hose of the thyroid of Graves' disease and those
yroid adenoma. Although the two papillary car-
mas examined had two kinds of TSH receptors, one
e carcinomas showed decreased association con-
ts for both high- and low-affinity receptors. (7
ences)

STEROIDOGENIC PATHWAYS AND TROPHIC RESPONSE TO ADRENOCORTICOTROPHIN OF CULTURED ADRENO-
CAL CELLS IN DIFFERENT STATES OF DIFFERENTIATION.

) Slavinski, E. A. (Cancer Res. Centre, Univ.
sh Columbia, Vancouver, Canada); Jull, J. W.;
perg, N. *J Endocrinol* 69(3): 385-394; 1976.

ocortical cells from 1- to 3-mo-old male Fischer
were propagated in monolayer culture. Depending
lture conditions, they grew either as lipid-
ining epithelial-like cells with a high level of
id production or as fibroblastlike cells with a
evel of steroid production. The major fluoro-
steroid secreted by both morphologic forms was
costerone. Basal fluorogenic steroid production
0^{6} cells over 24 hr was: epitheliallike cells,
g; fibroblastlike cells, 0.014 μg. Stimulation
adrenocorticotropic hormone (ACTH) for 5 days
ased fluorogenic steroid production and induced
logic changes in both cell forms. ACTH-induced
id production reached a maximum after 3 days
en dropped to a refractory state after 5 days.
aximal ACTH stimulation, production increased
es in fibroblastlike cells and 5 times in
lial-like cells. Progressive morphologic changes
bserved with ACTH stimulation: epithelial-like
retracted from the substratum and lost lipid
ions; fibroblastlike cells became more epi-
l-like. Both adrenal cell types formed inter-
es from 4-^{14}C-pregnenolone, including pregn-5-
,20α-diol and 20α-hydroxypregn-4-en-3-one.
1 cultures of muscle fascia fibroblasts did
oduce corticosterone or intermediates from
pregnenolone and did not respond to ACTH func-
ly or morphologically. (22 references)

ISOLATION AND HORMONE-RESPONSIVENESS OF INTACT CELLS FROM A TRANSPLANTABLE OSTEO-
SARCOMA IN THE RAT.

(Eng.) Atkins, D. (Dept.
al Pathology, Univ. Sheffield Medical Sch.,
eld S10 2RX, England); Campbell, A. H.; Ingle-
. M.; Hunt, N. H.; Martin, T. J. *Biochem Soc*
4(2): 289-290; 1976.

Intact cells from a transplantable osteogenic tumor in rats were obtained and purified using Ficoll/Triosil gradient techniques. More than 90% of the cells remain intact, as judged by trypan blue exclusion tests. In the presence of parathyroid hormone there was a rapid increase in cellular cyclic AMP concentration, which was maximal within 5 min of adding the hormone. The parathyroid hormone produces a typical sigmoid log dose-response curve with half-maximal stimulation at 20 nM. This model system could be used to study the action of parathyroid hormone on bone formation and resorption at the cellular and subcellular level, since these intact cells have some characteristics of bone cells. (4 references)

6568 THE EFFECT OF CYCLIC ADENOSINE 3',5'-MONOPHOSPHATE ON THE UPTAKE OF ESTRADIOL BY THE NEONATAL MOUSE UTERUS: AN AUTORADIOGRAPHIC STUDY.

(Eng.) Eide, A. (Inst. Anatomy, Univ. Bergen, Arstadveien 19, 5000 Bergen, N-Norway); Fossberg, T. M. *Cell Tissue Res* 169(1): 1-6; 1976.

Uterine tissue from neonatal NMRI mice was incubated in vitro at 0 C for 1 hr in a medium containing 1 x 10^{-8} M ^{3}H-estradiol with or without 1 x 10^{-4} M dibutyryl cyclic AMP. In some incubations the temperature was raised to 37 C for 15 min after incubation in the cold, in others the temperature was kept at 0 C. The tissue was frozen in liquid propane and sectioned at 2 or 4 microns; autoradiograms were prepared according to the dry-mount procedure. Cyclic AMP increased the cellular uptake of ^{3}H-estradiol in uterine tissue. After the temperature was raised to 37 C, grains appeared over the nuclei. Cyclic AMP at low temperature increased the cellular uptake of ^{3}H-estradiol, but the grains were not associated with the nuclei. In the autoradiograms the grain number above the epithelium was markedly less than that above the stroma. (14 references)

6569 LEUKOCYTE LIPIDS IN MATURE LEUKEMIAS.

(Ger.) Bleiber, R. (Medizinische Klinik, Humboldt-Universitaet, Schumannstrasse 20, DDR-104 Berlin, East Germany); Kunze, D.; Reichmann, G.; Hofer, E. *Acta Haematol (Basel)* 55(2): 81-88; 1976.

The lipid content and distribution and fatty acid pattern in lymphocytes and granulocytes of mature leukemias were determined. The mean lipid content per milligram of protein was 422 nmol in normal lymphocytes and 441 nmol in leukemic lymphocytes (LL). In normal granulocytes the level was 694 nmol in contrast to 482 nmol for leukemic granulocytes (LG). Phospholipid content varied insignificantly between control and leukemic samples. Normal cells contained more triglyceride in neutral fat than either LL or LG, but the difference was insignificant in LL. LL also contained significantly less sphingomyelin and insignificantly more lecithin than normal cells; these patterns are lacking in LG. The fatty acid composition of phosphatidylethanolamine and sphingomyelin varied insignificantly between LL or

LG and normal cells. In phosphatidylcholine the C_{16} and saturated C_{18} acids were significantly increased, and the unsaturated C_{18} acids were significantly decreased, in LL and LG relative to normal cells. (11 references)

6570 LECTIN AND CHOLERA TOXIN BINDING TO GUINEA PIG TUMOR (104CL) CELL SURFACES BEFORE AND AFTER GLYCOSPHINGOLIPID INCORPORATION.

(Eng.) Basu, M. (Dept. Chemistry, Univ. Notre Dame, Notre Dame, IN 46556); Basu, S.; Shanabruch, W. G.; Moskal, J. R.; Evans, C. H. *Biochem Biophys Res Commun* 71(1): 385-392; 1976.

^{125}I-Labeled *Dolichos biflorus* lectin and cholera toxin were used as probes to identify Forssman- and GM1-type receptor sites on guinea pig tumor (104C1) cell surfaces. Increased binding of ^{125}I-labeled lectin and toxin to 104C1 cell surfaces was observed after the cells were treated with exogenous Forssman glycosphingolipid and GM1 ganglioside, respectively. Biosynthesis in vitro of these two glycosphingolipids from their precursor molecules was established with a membrane preparation isolated from confluent cultures of 104C1 cells. (45 references)

6571 BIOCHEMICAL INVESTIGATIONS OF CANCER CACHEXIA. I. TUMOR-INDUCED CHANGES OF GLYCOGENOLYSIS AND GLUCONEOGENESIS OF RATS WITH WALKER CARCINOMA.

(Ger.) Schulze, B. (Klinik u. Poliklinik fuer Strahlenkunde und Roentgendiagnostik der Univ. Marburg/Lahn, D-3550 Marburg/Lahn, Robert-Koch-Strasse 8a, West Germany); Buchelt, L.; Kurtze, G.; Lorenz, H. G. *Z Krebsforsch* 85(1): 21-28; 1976.

Male Sprague-Dawley rats who had received subfascial injections of Walker carcinoma 256 suspensions exhibited serum glucose reductions proportional to increasing tumor weight. When the tumor weight reached 40 g the glucose level was 60 mg%, or nearly half the initial value. Glucagon (0.2 mg ip) mobilization of glycogen in experimental animals was lower than that in controls, but the difference was the same before glucagon stimulation. Although tumor presence stimulated liver glucose-6-phosphatase above control levels, subsequent glucagon had little additional effect. Betamethasone im failed to elevate either glucose-6-phosphatase or fructose-1,6-diphosphatase. The free fatty acids, whose initial levels were the same in control and experimental animals, tripled in both groups after massive stimulation of peripheral lipolysis by hunger, low temperature, or caffeine stress. (18 references)

6572 BIOCHEMICAL INVESTIGATIONS OF CANCER CACHEXIA. II. DEPLETION OF GLYCOGENOLYSIS AND STIMULATION OF GLUCONEOGENESIS IN RATS WITH WALKER CARCINOMA 256.

(Ger.) Schulze, B. (Radiologie-Zentrum der Philipps-Univ., D-3550 Marburg/Lahn, Robert-Koch-Strasse 8a, West Germany); Buchelt, L.; Dittmann, H. W.; Mensch, K. W. *Z Krebsforsch* 85(1): 29-38; 1976.

The liver glycogen content of male Sprague-Dawley
rats with Walker carcinoma 256 varied inversely w
tumor weight; total glycogen depletion occurred
rapidly when the carcinoma reached 40 g. Glycogen
mobilization after glucagon challenge (0.2 mg ip)
was also progressively diminished with increasing
tumor weight up to complete disappearance. In bot
control and experimental groups, two-thirds of th
total liver phosphorylase occurred as α-phosphory
activity; both activities were halved at tumor we
of 30-40 g, an outcome unchanged by intracardial
epinephrine challenge. Accordingly, inhibition of
glycogen mobilization was not a tumor effect. Accelerated gluconeogenesis is the explanation of
choice in correlating the early liver glycogen di
pearance with the late-occurring tumor hypoglycem
in venous blood. Liver tyrosine aminotransferase
activity in experimental rats was doubled over th
of controls after 6-methyl prednisolone administr
tion, although both groups had comparable initial
levels. Two other liver enzyme indicators of hormonal gluconeogenesis, alanine aminotransferase a
fructose-1,6-diphosphatase, were unresponsive; a
3.5-fold increase of both enzymes in both groups
reached sluggishly in 3 days only after massive
challenges of 9α-fluoro-16α-hydroxyprednisolone.
Fructose-1,6-diphosphatase increased about 25% i
both groups after similar challenges. The hypogl
cemia in experimental animals evidently mirrors
decompensation of gluconeogenetic regulation, to
which a tumor-induced inhibition of gluconeogene
enzymes contributes. This is confirmed in the ca
of small tumors (2-10 g) in whose hosts there is
significant serum glucose elevation. Here, under
conditions of rapid glycogen depletion, gluconeo
genesis overcompensation is not yet affected by
tumor toxicity. (17 references)

6573 GLYCOGEN SYNTHESIS BY TWO EHRLICH ASCI TUMOR CELL STRAINS IN VITRO.

(Eng.) Gr
zow, C. (Institut fuer Zellforschung am Deutsche
Krebsforschungszentrum, D-6900 Heidelberg, Im Ne
heimer Feld 280, West Germany); Granzow, V. *Virc
Arch* [*Zellpathol*] 18(4): 281-285; 1975.

The in vitro synthesis of glycogen from glucose
studied in two closely related strains of Ehrli
ascites tumor cells, G+ and HD 33. Ten individu
tumors were taken from special pathogen-free ma
NMRI mice (6 wk old) that had been injected ip
previously with 10 x 10^6 cells of the G+ or the
33 strain. Washed tumor cells were suspended in
Earle's balanced salt solution at 6 x 10^6 cells
and the suspension was divided into three 3 ml
quots. D-Glucose was added to one of the flasks
final concentration of 5.5 mM and [^{3}H]D-glucose
second flask at 1 μCi/ml; the third aliquot ser
as a control. At 3 and at 30 min after glucose
tion, 1 ml samples were taken and centrifuged.
were prepared from the collected cells, stained
the PAS-reaction, and studied by autoradiograph
Tiny deposits of PAS-positive material were see
only a few of the HD 33 and G+ tumor cells when
freshly removed from the peritoneal cavity. Thr
min after addition of D-glucose, the number of

ls showing PAS-positive deposits increased. Thirty
after the addition of glucose, a further strong
rease in the fraction of cells with PAS-positive
osits was seen, together with an increase in the
e of the deposits. The deposits were mainly intra-
lear but many of the cells also showed cytoplas-
deposits. The deposits disappeared from the
ed cells after 6 to 8 hr exposure to amylogluco-
ase solution. These observations suggest the
cogen nature of the PAS-positive deposits and the
lity of the tumor cells not only to accumulate
also to produce glycogen. (14 references)

4 LONG-DISTANCE INTERACTIONS BETWEEN EHRLICH ASCITES TUMOR CELLS. (Eng.) Weiss, L.
ot. Experimental Pathology, Roswell Park Memorial
:., Buffalo, NY 14203); Nir, S.; Harlos, J. P.;
jeck, J. R. *J Theor Biol* 51(2): 439-454; 1975.

tron micrographs showing evidence of alignment
ween microvilli from one Ehrlich ascites tumor
with specific areas of another are interpreted,
st on the assumption that the estimated distance
00 nm between cells is correct and then on the
mption that it is overestimated due to prepara-
artifacts. The Ehrlich ascites tumor cells had
cultured on coverslips after reacting some of
r negatively charged surface sites with colloidal
hydroxide particles. Four interactions that
d occur over distances of up to 200 nm are briefly
ewed: (1) electrostatic interactions, (2) elec-
ynamic interactions, (3) diffusion of material
ween cells, and (4) macromolecular bridging. The
mption that the estimated distance of 200 nm
ween cells is correct eliminates the possibility
lectrostatic and electrodynamic interaction,
h cannot occur over distances exceeding 30 nm.
arations were examined following staining with
nferritin conjugates that react with β-D-Gal,
structurally similar residues, with ruthenium
or lanthanum nitrate, which react extensively
surface constituents. In 61% of the regions
ined, no material was visualized bridging the
between presumptive aligned regions. This seems
liminate hairlike processes, which would remain
r processing as an alignment mechanism. At separa-
distances in excess of 200 nm, a feasible align-
mechanism is: negatively charged macromolecules
using out of cells in the region of microvilli
trostatically repel (colloidal iron hydroxide-
ing) anionic sites in the lipid-rich fluid matrix
he periphery of the opposed cell, causing gaps
heir distribution. At distances less than 5 nm,
electrostatic effect would be similar in prin-
e to that of a macromolecule diffusing toward
surface. For distances of 10 nm or less electro-
mic interactions could account for the observed
nment. Under the conditions of physiological
c strength (1/k = 1 nm) used in these experi-
s, it is also possible that flexible macromol-
es with a high degree of mobility due to field
urbation effects and thermal agitation, could
out and react with physicochemically compatible
ons of another cell at distances less than 200
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AARONSON, S. A. 6295
ABADI, P. 6533*
ABATA, J. J. 6258*
ABE, Y. 6565
ABNEY, E. R. 6098*
ABREU, M. 6202*
ACHESON, E. D. 6001
ACTON, A. B. 6065*
ADAMS, A. 6081*
ADELSTEIN, S. J. 6268*
ADEN, D. 6428
ADLER, S. S. 6126*
AGHAI, E. 6340*
AGRIS, P. F. 6582*
AGTHE, C. 6058*
AHLENDORF, W. 6463*
AISENBERG, A. C. 6094*
AKESON, R. 6347
ALBRECHT, C. F. 6144
ALEKSANDROWICZ, J. 6387*
ALLEN, J. R. 6213*
ALLISON, A. C. 6091*
ALMASAN, M. 6481*
ALTHOFF, J. 6163, 6432
ALTMEYER, P. 6464*
ALVAREZ, Y. 6298
ALVORD, E. C. 6100*
ANDERSON, D. 6193*
ANDERSON, W. F. 6576*
ANDREEVA, P. 6414
ANDREWS, A. D. 6239
ANTWEILER, H. 6061*
AOSHIMA, M. 6484*
ARCHAMBEAU, J. O. 6258*
ARIGA, K. 6506
ARORA, H. L. 6140
ARYA, S. K. 6318, 6320
ATKINS, D. 6567
AUERSPERG, N. 6566
AURELIAN, L. 6109*
BABA, N. 6165
BAGINSKI, B. 6520
BAINTON, D. F. 6563
BAKHSHANDEH, K. 6533*
BALDWIN, R. W. 6092*
BALTZ, R. H. 6043*
BANROQUES, J. 6559
BANSKALIEVA, V. B. 6598*
BAPTIST, J. N. 6226*
BARANSKA, J. 6598*
BARD, L. A. 6439*
BARD, P. A. 6439*
BARKER, C. R. 6353
BARKER, J. E. 6576*
BARON, D. 6547
BARRETT, S. F. 6239
BARTHOLEYNES, J. 6587*
BARTHOLOMEW, J. C. 6544
BARTSCH, H. 6138, 6171*
BARYLAK, H. 6502
BAST, R. C. 6198*, 6199*
BASU, M. 6570
BASU, S. 6570
BASU, T. K. 6394
BATSAKIS, J. G. 6274*
BAUDHUIN, P. 6587*
BAUER, L. 6147
BAYLISS, D. L. 6273*
BEAR, S. E. 6356
BEARD, M. E. 6122*
BEARDMORE, G. 6474*
BECH-NIELSEN, S. 6367
BECKLAKE, M. R. 6050*
BEDNAR, T. W. 6177*
BELITSKY, G. A. 6537*
BELL, R. 6444*
BEN-ZVI, Z. 6201*
BEND, J. R. 6201*
BENDER, E. 6302
BENDER, M. D. 6472*
BENNETT, G. 6258*
BENNETT, M. 6328*
BERBERICH, M. S. 6442*
BERG, T. 6141
BERGELSON, L. D. 6597*
BERGER, R. 6421
BERGSAGEL, D. E. 6349
BERMAN-GOLDMAN, R. 6345
BERNDT, H. 6507
BERNFELD, P. 6176*
BERSCH, W. 6476*
BERTEL, O. 6395
BERTRAMS, J. 6093*
BETTS, T. E. 6175*
BHARGAVA, S. 6402
BIASI, G. 6360
BICE, D. E. 6392*
BIGGER, T. R. 6212*
BILLER, H. F. 6465*
BILLING, R. J. 6383*
BILLMIRE, D. F. 6366
BIRD, G. W. 6412, 6413

BISHOP, J. M.
6322*
BIXLER, D.
6418
BLANK, H.
6019
BLAYLOCK, B. G.
6244*
BLEIBER, R.
6569
BLEJER, H. P.
6048*, 6273*
BLOOMFIELD, C. D.
6448*
BLUMBERG, P. M.
6592*
BOAK, J. L.
6373
BOBROWSKI, A.
6502
BOCZKOWSKI, K.
6435*
BODANSKY, O.
6101*, 6102*, 6103*, 6111*,
6112*, 6131*
BOEHLECKE, J. M.
6381*
BOGACKI, W.
6502
BOGGUST, W. A.
6416
BOIKOVA, V. I.
6430, 6561
BOLAND, S. L.
6406
BOLEY, S. J.
6470*
BONAVIDA, B.
6096*
BONDURANT, M.
6289
BOORMAN, G. A.
6538
BOREK, C.
6271*
BORGSTROM, G. H.
6449*
BORGWARDT, G.
6425
BORK, K.
6407
BOSMAN, F. T.
6438*
BOTTURA, C.
6451*
BOURGAUX, P.
6310
BOURGAUX-RAMOISY, D.
6310
BOYER, H. W.
6304
BRAND, K. G.
6014
BRANDA, R. F.
6410
BRAXTON, E. L.
6504
BRENNAN, M. J.
6027
BREWER, G. J.
6351
BREWSTER, D.
6162
BRIDGES, B. A.
6055*
BRINKMANN, W.
6542
BRINSTER, R. L.
6490*
BRITTON, D. C.
6466*
BRODER, S.
6350
BROOKS, T. L.
6301
BROWN, C. C.
6034*
BRUCH, J.
6062*
BRUCKNER, V.
6233
BRUNNING, R. D.
6364, 6448*
BUCEK, J.
6404
BUCHELT, L.
6571, 6572
BUCKMAN, T.
6281
BUDMEN, M. B.
6367
BUELL, D. N.
6564
BUFFETT, R.
6079*
BUJURINA, I. M.
6148
BUNDSCHUH, G.
6425
BURKITT, D. P.
6105*
BURNS, G. F.
6353
BUSBEE, D.
6202*
BUSCH, R. H.
6179*
BUSS, E. R.
6317
BUSSEL, A.
6421
BUTLER, W. H.
6123*
BUTTERWORTH, B. E.
6336*
BUZEK, J.
6277
BYRD, D.
6079*
CAMERON, K. R.
6020
CAMERON, R.
6044*
CAMPBELL, A. H.
6567
CANELLOS, G. P.
6128*
CANEVARI, S.
6386*
CANTRELL, E.
6202*
CARDA-ABELLA, P.
6560
CARDESA, A.
6163, 6432
CARLSON, S. A.
6594*
CARPENTIER, N. A.
6382*
CARR, I.
6427
CARTER, D. M.
6236
CARTER, W.
6079*
CARTER, W. A.
6318, 6320
CASPARY, E. J.
6459*
CASTOLDI, G. L.
6409
CATON, J.
6174*
CAVALIERI, E.
6200*
CAWLEY, J. C.
6353
CHAN, E.
6293
CHAN, P.
6057*
CHANCE, B.
6584*
CHANDRA, K
6398
CHANG, R. S.
6313
CHAPMAN, M. L.
6385*
CHARMAN, H. P.
6329*
CHAUVEL, P.
6497
CHECHIK, B. E.
6125*
CHESBRO, B.
6331*
CHESBRO, K.
6331*
CHESS, L.
6380*
CHESTER, G. H.
6413
CHIECO-BIANCHI, L.
6360
CHIGA, M.
6351
CHOU, S. F.
6479*
CHRISTOFFERSEN, T.
6141
CICHON, S.
6502

CIOL, K.
6411
CLAIRMONT, A. A.
6461*
CLARKSON, J. M.
6253*
CLAYSON, D. B.
6037*
CLEAVER, J. E.
6039*, 6262*, 6272*
CLIFTON, K. H.
6257*
CLYMER, R.
6355
COHEN, L.
6057*
COLLAVO, D.
6360
COLOE, P. J.
6161
COLOMBATTI, A.
6360
CONDIT, E. S.
6236
CONNEY, A. H.
6196*, 6204*
COOKE, T. J.
6373
COOPER, E. L.
6089*
COOPER, J.
6509
COOPER, M. D.
6098*
COOPER, N. R.
6282
CORNELIUS, C. E.
6046*
CORNISH, H. H.
6192*
COSTA, J.
6337*
COSTA, M.
6558
COUTINHO, A.
6368
COUTINHO. V.
6451*
CREASIA, D. A.
6195*
CRITCHLEY, D. R.
6279
CROWSON, T. D.
6237
CUENDET, J.
6017
CUNNINGHAM, D. D.
6593*
CURRIE, G. A.
6095*
D'AGOSTINO, M. A.
6551
DALBEY, W.
6174*
DAN, N. G.
6459*
DANIELE, R.
6390*
DANSETTE, P. M.
6201*
DAOUST, R.
6133*
DAS GUPTA, T. K.
6545
DAUM, F.
6470*
DAVID, J. C.
6189*
DAVIDSON, N.
6322*
DAVIS, N.
6474*
DAVIS, S.
6358
DE BERSAQUES, J.
6586*, 6599*
DE LA CHAPELLE, A.
6449*
DE LAMIRANDE, G.
6133*
DE MUELENAERE, G. F.
6526*
DE RIDDER, L.
6539, 6540
DE SERRES, F. J.
6031*
DE-THE, G.
6082*
DEFENDI, V.
6026
DEFTOS, L. J.
6538
DEISSEROTH, A.
6576*
DELBECCHI, L.
6310
DELESCLUSE, C.
6029
DELLA PORTA, G.
6386*
DEMENT, J. M.
6273*
DEPIEDS, R. C.
6384*
DESCHNER, E. E.
6552
DIERTICH, D.
6507
DIETZ, M.
6355
DIETZSCHOLD, B.
6303
DIEZEL, W.
6235
DITTMANN, H. W.
6572
DITTRICH, H.
6529*
DOAK, S. M.
6223*
DOBASHI, Y.
6252*
DOBAY, O.
6481*
DOBRIN, R. S.
6458*
DOERFLER, W.
6307
DOLEJS, J.
6238
DOLGNER, R.
6073*
DONAHOE, R. M.
6295
DONALDSON, D.
6394
DORING, E.
6425
DORMER, P.
6542
DOUGLAS, S. D.
6359, 6410
DOYLE, T.
6292
DRAKE, J. W.
6043*
DREOSTI, I. E.
6577*
DROGEMULLER, C. R.
6343
DROP, R.
6502
DUNCAN, J. R.
6577*
DUNDAS, J. B.
6419
DURM, M.
6350
DYATLOVITSKAYA, E. V.
6597*
EASTY, D. M.
6137*
EASTY, G. C.
6137*
ECKNER, R. J.
6328*
EDGE, J. R.
6517
EDINGTON, G. M.
6505
EDMONSON, H. A.
6066*
EDWARDS, R. G.
6348
EGGERS, A. E.
6393*
EIDE, A.
6568
EISENBRAND, G.
6220*
EL-DOMEIRI, A. A.
6545
ELAD, D.
6077*
ELKIND, M. M.
6261*
ELSON, L. A.
6175*
ENGELHARDT, G.
6219*
ERBE, R. W.
6471*
ERDELY, E.
6531*

* INDICATES A PLAIN CITATION WITHOUT ACCOMPANYING ABSTRACT

ERICKSON, L. C. 6580*
ESBER, E. C. 6564
ESCOBAR, V. 6418
ESSEX, M. 6329*
EURENIUS, K. 6455*
EVANS, C. H. 6570
EVANS, L. H. 6287
EVANS, M. J. 6079*, 6485*
FARBER, E. 6044*
FARN, K. T. 6076*
FASSKE, E. 6299
FELDMAN, M. 6362
FELICETTI, D. 6157
FERRANS, V. J. 6399
FERRANTE, W. A. 6237
FETTING, R. 6299
FEY, F. 6288, 6454*
FIALA, M. 6280
FIDLER, I. J. 6367
FISCHER, M. 6425
FISH, A. J. 6458*
FITZGERALD, M. A. 6356
FITZGERALD, P. H. 6452*
FITZPATRICK, T. B. 6266*
FJELDE, A. 6079*
FLEISCHER, J. 6408
FOLKMAN, J. 6397
FONG, C. K. 6300
FORBES, P. D. 6264*
FORCHHAMMER, J. 6333*
FOSSATI, G. 6386*
FOSSBERG, T. M. 6568
FOX, B. W. 6214*
FRACCARO, M. 6482*
FRANKE, F. P. 6208*
FRENKEL, N. 6083*
FRENZEL, B. 6303
FRIEDLAND, J. 6417
FRIEDRICHS, K. H. 6072*
FRISCHAUF, H. 6238
FRISCHMUTH, I. 6547
FRITSCH, E. 6322*
FRITZ-NIGGLI, H. 6181*, 6521
FRITZE, D. 6343
FUJIWARA, Y. 6247*
FUKAMI, J. 6216*
FUKUSHIMA, S. 6158
FURMANSKI, P. 6355
GAHR, M. 6456*
GAJL-PECZALSKA, K. 6389*
GAJL-PECZALSKA, K. J. 6448*
GALASINSKI, W. 6553, 6554
GALLIMORE, P. H. 6120*
GALLO, R. C. 6296
GARAGLIANO, C. F. 6106*
GARBRECHT, M. 6557
GARCIA-BUNUEL, R. 6460*
GARDNER, J. W. 6503
GARDNER, M. B. 6293
GAROTTA, G. 6369
GARRO, A. J. 6182*
GARWIN, J. L. 6583*
GEHM, O. 6496
GEHRING, P. J. 6154, 6206*, 6207*
GELBOIN, H. V. 6145, 6198*, 6199*
GELEHRTER, T. D. 6583*, 6594*
GELFAND, E. W. 6125*
GELLATLY, J. B. 6143, 6372
GENZIKE, F. 6232
GEORGII, A. 6457*
GERLACH, H. 6159
GERNER, E. W. 6558
GIANGIACOMO, J. 6445*
GILDEN, R. V. 6290, 6329*
GILLETTE, E. L. 6433
GLASER, M. 6332*
GLATT, H. R. 6197*
GLENN, M. W. 6224*
GLOVER, J. L. 6562
GOODY, H. M. 6140, 6172*
GOLDMAN, C. 6350
GOLDROSEN, M. H. 6225*
GOLOMB, H. M. 6415
GONZALEZ-VITALE, J. C. 6460*
GOOD, R. A. 6389*
GOODALL, C. M. 6130*
GOODMAN, H. M. 6304
GORING, H. D. 6354
GORKOVA, N. P. 6597*
GORLIN, R. J. 6114*
GORSKI, J. 6495
GOTLIEB-STEMATSKY, T. 6340*
GOUGH, T. A. 6536*
GOULD, M. N. 6257*
GOURIN, A. 6417
GOYINGS, L. S. 6224*
GRAF, W. 6147, 6194*
GRAFE, A. 6221*
GRAFFI, A. 6302
GRAHAM, C. F. 6487*
GRAHAM, D. Y. 6151
GRAHN, D. 6242*

GRANZOW, C. 6573
GRANZOW, V. 6573
GRATZNER, H. G. 6579*
GRAVELL, M. 6341*
GREEN, M. 6306
GREEN, M. H. 6055*, 6301
GREEN, M. K. 6215*
GREENBERG, G. 6164
GREENWOOD, B. M. 6505
GREER, H. S. 6499
GREGORY, P. A. 6191*
GRIESEMER, R. 6174*
GRIESER, N. 6063*
GRIMM, T. 6401
GRONOWICZ, E. 6368
GRONWALL, R. R. 6046*
GROSS, K. J. 6580*
GRUSOVIN, G. D. 6409
GRUWELL, D. 6392*
GUBATZ, W. 6425
GUERIN, M. 6174*
GUNTAKA, R. V. 6322*
GUPTA, P. 6316
GUPTA, R. K. 6344
GUPTA, S. 6494
GUPTA, S. R. 6139, 6168*
GUTTENPLAN, J. B. 6182*
GUZE, L. B. 6280
HAGEMANN, R. E. 6509
HAGHIGHI, P. 6533*
HAHN, E. C. 6324*
HAINES, H. 6019
HALE, A. H. 6281
HALL, J. D. 6129*
HALL, J. G. 6442*
HALMOS, J. 6396
HALSTED, J. A. 6469*
HALTER, A. 6501
HAMMERLING, U. 6480*
HAN, A. 6261*
HANANOUCHI, M. 6158
HANDLER, A. 6190*
HANDLER, E. E. 6483*
HANDLER, E. S. 6483*
HANSCHE, G. 6507
HANSCHE, R. 6507
HARDY, W. D. 6329*
HARLOS, J. P. 6574
HARTER, M. L. 6306
HARTLEY, J. W. 6294
HASHIMOTO, K. 6400
HATZFELD, A. 6559
HAUFSTEIN, U. F. 6002
HAVELEC, L. 6529*
HAYAMI, M. 6278
HAYASHI, H. 6375
HAYES, L. C. 6351
HAYHOE, F. G. 6353
HAYNES, H. A. 6266*
HAYWARD, G. 6083*
HAYWARD, N. J. 6161
HEBEL, J. R. 6230*
HEIDELBERGER, C. 6205*
HEINE, J. W. 6280
HEINER, D. C. 6280
HELLSTROM, I. 6278
HELLSTROM, K. E. 6278
HENDERSON, B. E. 6066*
HENTSCHEL, E. 6529*
HERBERMAN, R. B. 6332*
HERSCHMAN, H. R. 6347
HETZEL, F. W. 6255*
HIETER, P. H. 6555
HIGASHIKAWA, T. 6247*
HIGGINSON, J. 6054*, 6058*
HILL, P. 6057*, 6228*
HILL, R. D. 6420
HILLIARD, J. L. 6151
HIMES, J. A. 6046*
HINUMA, Y. 6314
HIRAI, M. 6227*
HIRAYAMA, C. 6575
HIROHASHI, S. 6374, 6375
HO, T. S. 6593*
HOFER, E. 6569
HOFFMANN, D. 6003
HOHNE, W. E. 6235
HOLDEN, H. T. 6332*
HOLLAND, J. F. 6556
HOLT, J. 6474*
HOLYOKE, E. D. 6225*
HOMBURGER, F. 6176*, 6190*
HOMMA, M. 6565
HONDLIK, J. 6363
HONESS, R. W. 6083*, 6280
HONIG, R. 6383*
HORIKAWA, M. 6214*
HORNING, M. G. 6191*
HOROSZEWICZ, J. 6079*
HOROSZEWICZ, J. S. 6318, 6320
HORTON, W. A. 6117*
HOSTELER, K. Y. 6581*

HOULT, J. G.
6412
HOWANIETZ, N.
6238
HOWE, J. R.
6008
HOWETT, M. K.
6084*
HRABOWSKA, M.
6475*
HRUBAN, Z.
6443*, 6479*
HSIUNG, G. D.
6300
HSU, C. C.
6357
HSU, I. C.
6213*
HSU, W. P.
6477*
HUDSON, J. B.
6283, 6286
HUMPHREYS, R. E.
6380*
HUNT, N. H.
6567
HUNT, P. F.
6223*
HUG, S. F.
6512
HUSZNO, B.
6502
HUTTERER, F.
6182*
HYDE, C.
6248*
HYNES, R. O.
6279
ICHIHASHI, M.
6247*
ICHIKAWA, Y.
6565
IKEDA, H.
6346
IKENAGA, M.
6209*
ILES, S. A.
6487*
ILNITSKY, A. P.
6537*
INBAR, M.
6595*
INGLETON, P. M.
6567
INGRAM, D. J.
6579*
IRISA, T.
6575
IRMSCHER, J.
6408
ISHIBASHI, M.
6339*
ISHIBASHI, T.
6165
ISHIDATE, M.
6484*
ITABASHI, M.
6443*, 6479*
ITO, K.
6565
ITO, N.
6158
ITO, Y.
6334*
IVANOVA, M. V.
6030
IVERSON, M.
6585*
IYENGAR, B.
6398
IZUI, S.
6382*
JACOB, H. S.
6410
JACOB, R.
6083*
JACOBI, W.
6074*
JACOBSON, C. B.
6185*
JANICKI, K.
6492
JENKINS, S.
6486*
JENNER, M.
6394
JENSEN, F. C.
6282
JENTSCH, E.
6456*
JERINA, D. M.
6201*, 6204*
JERNIGAN, M. C.
6250*
JHA, K. K.
6338*
JOHNSON, D. E.
6192*
JOHNSTON, R. L.
6224*
JONCAS, J. H.
6312
JONDAL, M.
6315
JONES, G.
6123*, 6140
JONES, R. S.
6162
JUDAH, D. J.
6140
JULL, J. W.
6566
JUSSAWALLA, D. J.
6498
KAADEN, O. R.
6303
KABAT, D.
6287
KADA, T.
6184*
KAHAN, M.
6345
KAISERLING, E.
6440*
KAKUK, T. J.
6224*
KAKUNAGA, T.
6209*
KALF, G. F.
6551
KAMEYA, T.
6374, 6375
KANANISHI, N.
6070*
KANO, E.
6260*
KAPLANSKI, S.
6384*
KAPLOW, L. S.
6300
KAPP, R. W.
6185*
KARASAKI, S.
6588*
KARCIOGLUE, Z.
6461*
KARL, P.
6463*
KARMANOVA, N. V.
6377
KARY, C. D.
6191*
KASAMATSU, H.
6305
KATHMANN, P.
6307
KATSUKI, T.
6314
KATSUNUMA, H.
6252*
KATZ, A. I.
6319
KATZ, S.
6552
KAWABATA, T.
6165
KAWACHI, T.
6156
KAWAMURA, Y.
6285
KAWASHIMA, K.
6346
KAY, C. R.
6067*
KAY, E.
6259*
KAY, N. E.
6359
KEANE, A. T.
6245*
KEARNEY, J. F.
6098*
KEINERT, K.
6467*
KELLER, J. W.
6205*
KELLERMANN, G. H.
6210*
KELLERMEYER, R. W.
6152
KELLOFF, G. J.
6295
KELLY, M. R.
6229*

KENDE, G.
6340*
KENDRICK, J.
6174*
KENG, P.
6241*
KENNEDY, T. H.
6180*
KENT, D. R.
6149
KENYON, A. J.
6324*
KERN, D. H.
6343
KESMODEL, C. E.
6439*
KESSLER, I. I.
6109*
KHELTSER, F.
6232
KIDD, P.
6413
KIELANOWSKA, M.
6323*
KIM, N.
6329*
KIM, S. N.
6324*
KIMURA, I.
6334*
KINDERMANN, G.
6007
KING, C. M.
6177*
KINJO, Y.
6070*
KIPLING, M. D.
6004
KIRCHNER, H.
6332*
KIRK, W. P.
6243*
KIRSTEIN, W. H.
6319
KISSANE, J. M.
6445*
KLASINC, S.
6510
KLAUBER, M. R.
6503
KLEIN, I. B.
6488*
KMOCH, N.
6432
KNUDSON, A. G.
6116*
KOBAYASHI, H.
6330*
KOBER, V.
6467*
KOCH, J.
6248*
KODAMA, T.
6330*
KOIDE, T.
6374, 6375
KOIZUMI, A.
6252*
KOLAR, G. F.
6171*
KOLB, R.
6422
KOLODNY, G. M.
6255*
KOMIYAMA, A.
6455*
KONERMANN, G.
6075*
KONTRAS, S. B.
6441*
KOROPATNICK, J.
6032*
KORTING, G. W.
6407
KORZENIOWSKA, D.
6502
KOSTRODYMOV, N. N.
6155
KOSTRODYMOVA, G. M.
6155
KOTAKE, A.
6146
KOVI, E.
6424
KOZAK, M.
6083*
KOZLOWSKI, H.
6475*
KRAIN, L.
6028
KRAKAUER, R.
6350
KRAYBILL, H. F.
6064*
KRUEGER, R. G.
6381*
KRUGER, F. W.
6163
KRUGER, J.
6491
KUMAR, V.
6328*
KUNDU, N. G.
6205*
KUNG, H. J.
6322*
KUNICK, I.
6547
KUNZE, D.
6569
KUO, I.
6259*
KURTH, R.
6023
KURTZE, G.
6571
KUZUMAKI, N.
6330*
LAHIMGARZADEH, A.
6533*
LAISHES, B.
6044*
LAJTHA, L. G.
6596*
LAM, P.
6032*
LAMBERT, L. H.
6365
LAMBERT, P. H.
6382*
LAND, V. J.
6341*
LAPIN, B. A.
6335*
LAWLEY, P. D.
6038*
LAWSON, T. A.
6208*
LAWSON, W.
6465*
LAWTON, A. R.
6098*
LECHAGO, J.
6472*
LEE, J. A.
6508
LEE, P. A.
6229*
LEFEVRE, P. A.
6193*
LEGENDRE, S. M.
6555
LEHR, R. E.
6204*
LEIBOLD, W.
6312
LEIKIN, S. L.
6564
LEJNAR, J.
6363
LEMAN, J. M.
6488*
LENNERT, K.
6440*
LERCHE, W.
6405
LETHOLA, J.
6447*
LETT, J. T.
6241*
LEVENDEL, L.
6531*
LEVIN, N. M.
6099*
LEVIN, W.
6204*
LEVINE, A. J.
6129*
LEVINE, P. H.
6341*
LEVY, C. C.
6555
LEWIS, H. L.
6254*
LEWIS, M. G.
6391*
LEWISON, E. F.
6009
LICHT, A.
6352
LIEBENBERG, N. V.
6144
LIEBIG, H.
6221*

LIJINSKY, W. 6218*

LIKOVSKY, Z. 6363

LILIENFELD, A. M. 6106*

LILIENFELD, D. F. 6106*

LIM, S. D. 6389*

LIN, C. C. 6419

LINDENBAUM, A. 6242*

LINSMAIER-BEDNAR, F. M. 6177*

LITTLE, J. 6474*

LITTLE, J. B. 6263*, 6267*

LITVAI, G. 6531*

LLOYD, J. W. 6051*

LO CURTO, F. 6482*

LO, E. 6549

LOEB, L. A. 6578*

LOEB, W. F. 6486*

LOHMANN, J. 6183*

LONBERG-HOLM, K. 6336*

LONDON, D. A. 6236

LONG, C. W. 6290

LONG, F. C. 6552

LONGSTAFF, E. 6193*

LORENZ, H. G. 6571

LOWRY, K. M. 6551

LOZZIO, B. B. 6371

LU, A. Y. 6204*

LUCHNIK, N. V. 6234

LUDBROOK, G. J. 6478*

LUDUENA, M. A. 6585*

LYON, E. S. 6443*

LYON, J. L. 6503

LYONS, H. A. 6417

MACDERMOTT, R. P. 6350

MACK, C. 6480*

MADDOX, W. 6174*

MADEWELL, B. P. 6433

MADRID, E. O. 6154, 6207*

MAGEE, P. N. 6042*

MAIZEL, J. V. 6308

MALAISE, E. P. 6497

MALAVEILLE, C. 6138, 6171*

MALAVIYA, A. K. 6402

MALT, R. A. 6562

MANLY, K. 6079*

MANN, D. 6380*

MANSY, S. 6153

MANTEI, N. 6304

MAREEL, M. 6539, 6540

MARGULIES, D. H. 6024

MARQUARDT, H. 6033*

MARSDEN, M. 6129*

MARSHALL, V. R. 6478*

MARTIN, G. R. 6485*

MARTIN, M. S. 6559

MARTIN, R. R. 6173*

MARTIN, T. J. 6567

MASLO, K. H. 6405

MASON, H. 6271*

MASTERS, B. S. 6186*

MASTRO, A. M. 6589*

MASUBUCHI, Y. 6227*

MATE-JIMENEZ, J. 6560

MATEJKOVA, E. 6363

MATNEY, T. S. 6226*

MATSUOKA, O. 6071*

MATTHYSSE, A. G. 6169*

MAYR, W. R. 6422

MCBURNEY, M. W. 6487*

MCCLATCHEY, K. D. 6274*

MCCONLOGUE, L. C. 6254*

MCCOURT, D. W. 6145

MCCULLOCH, P. B. 6088*

MCGINTY, F. 6427

MCGOWAN, G. R. 6154, 6206*, 6207*

MCINTYRE, R. F. 6341*

MCLEOD, R. 6474*

MCRAE, D. M. 6149

MCWILLIAMS, R. W. 6367

MEADE, B. 6350

MEARNS, A. J. 6524*

MEDLINE, A. 6044*

MEE, L. K. 6268*

MEFFERT, H. 6235

MEINHOF, U. 6476*

MEISELS, A. 6085*

MELERO, J. A. 6550

MELIKIAN, V. 6412

MELLGREN, J. 6543

MENEZES, J. 6312

MENSCH, K. W. 6572

MERTELSMANN, R. 6557

MEYER, J. 6308

MEYERS, P. 6321*

MEZEI, A. 6531*

MICHALSKI, F. J. 6300

MIESCHER, P. A. 6382*

MIHAILOVICH, N. 6265*

MIKKE, R. 6323*

MILLER, C. O. 6522

MILLER, D. G. 6107*

MILLER, E. C. 6032*, 6040*

MILLER, H. 6198*

MILLER, J. A.
6040*, 6041*
MILLER, R. W.
6012
MILTON, G. W.
6406
MINEKAWA, Y.
6339*
MIRAULT, M. E.
6297
MISRA, V.
6283, 6286
MITCHELL, W. M.
6289
MITCHISON, N. A.
6025
MITTELMAN, L. A.
6148
MIYAKE, T.
6334*
MIYAKOSHI, J.
6260*
MODAN, M.
6340*
MOHR, U.
6163, 6432
MOLDOW, C. F.
6410
MONGA, J. N.
6402
MONTESANO, R.
6138
MONTGOMERY, C. A.
6486*
MOORE, D.
6351
MOORE, G. E.
6097*
MOORE, T. A.
6237
MORIGUCHI, M.
6538
MORIMOTO, K.
6252*
MORITA, T.
6251*
MORIUCHI, T.
6330*
MORRIS, H. P.
6424, 6581*
MORRISON, A. S.
6528*
MORRISON, M.
6134*
MORTON, R. F.
6230*
MOSKAL, J. R.
6570
MOSMANN, T. R.
6283, 6286
MOSS, E.
6530*
MOTTRAM, C. S.
6536*
MRUK, K.
6502
MULCAHY, N. F.
6525*
MULLER, P.
6463*
MUNYON, W.
6079*
MURAKAMI, M.
6216*
MURAKI, T.
6565
MURNANE, J.
6280
MUSIL, A.
6159
MUSSGAY, M.
6303
NAGAI, K.
6374, 6375
NAGASAKI, H.
6158
NAJFELD, V.
6453*
NAKAMURA, H.
6251*
NAKAMURA, M.
6165
NAKAOKA, T.
6165
NAOR, D.
6345
NASR, K.
6533*
NATHANSON, R. B.
6264*
NAZERIAN, K.
6086*
NEAL, G. E.
6140, 6172*
NEELY, M. G.
6215*
NEMOTO, N.
6199*
NETTESHEIM, P.
6174*, 6195*
NEUHAUS, K.
6395
NEUMANN, E.
6238
NEXO, B. A.
6333*
NICOLL, J. W.
6178*
NICOLSON, G. L.
6431
NIENHUIS, A. W.
6576*
NIEZABITOWSKI, A.
6302
NIGRISOLI, P.
6473*
NIKAIDO, O.
6214*
NINIO, M.
6340*
NIR, S.
6574
NISSANGA, S.
6513
NISSEN, E. D.
6149
NISSEN, S. E.
6149
NITSHKE, K. V.
6232
NOACK, C.
6425
NOOL, F.
6464*
NOMURA, T.
6375
NONOYAMA, M.
6311
NORMAN, A.
6254*
NOSTER, U.
6233
NOURSE, L. D.
6144
NOVIKOV, A. M.
6597*
NOWELL, P.
6390*
NOWINSKI, R. C.
6292
O'MALLEY, J.
6079*
O'NEILL, B.
6500
OESCH, F.
6197*
OGAWA, M.
6455*
OKUDA, T.
6198*, 6199*
OLD, L. J.
6346
OLDSTONE, M. B.
6282
OLINICI, C. D.
6481*
OLSON, R. J.
6179*
OOSTERKAMP, W. J.
6013
ORDONEZ, N. G.
6319
OROSZLAN, S.
6290
ORWELL, R. L.
6549
OSTBY, J. S.
6243*
OSTERMAN-GOLKAR, S.
6217*
OSTROWSKI, K.
6428
OWEN, L. N.
6104*
OZER, H. L.
6338*
PAGANO, J. S.
6341*
PAIGEN, K.
6132*
PAIN, C.
6271*
PANEM, S.
6319

PANOV, M. A.
6148, 6183*
PARDEE, A. B.
6135*
PARHAM, P.
6380*
PARKE, D. V.
6162
PARKHOUSE, R. M.
6098*
PARKIN, J.
6364
PARRISH, J. A.
6266*
PATEL, P.
6312
PATHAK, M. A.
6266*
PATTERSON, D.
6249*
PATTERSON, R. L.
6536*
PAUL, B.
6437*
PAWELEK, J. M.
6600*
PAYNE, L. N.
6078*
PAYNE, R. W.
6413
PEARSON, P. L.
6438*
PEDRINIS, E.
6450*
PEGG, A. E.
6178*
PELFRENE, A.
6049*
PEREZ-CUADRADO, S.
6560
PERRY, M. C.
6468*
PETERS, R. L.
6295
PETERSON, L. C.
6448*
PETERSON, P.
6383*
PETICOLAS, W. L.
6153
PETRES, J.
6547
PETTENGILL, O. S.
6423
PFETZING, H.
6221*
PFLUGER, H.
6422
PHEASANT, A. E.
6150
PHILLIPS, M. L.
6523*
PHILLIPS, T. M.
6391*
PHOTOPULOS, G.
6113*
PICKEL, H. G.
6480*
PIKE, M. C.
6066*
PILCH, Y. H.
6343
PIPER, D. W.
6549
PIPPARD, M. J.
6412
PLANT, A. F.
6519
PLAPP, F. V.
6351
POGGENBURG, J. K.
6195*
POGO, A. O.
6580*
POIRIER, L. A.
6187*
POLANI, P. E.
6121*
POLE, J. R.
6127*
POLLACK, A.
6579*
POLLACK, R.
6590*
POLONOFF, E.
6287
POMMIER, G. J.
6384*
POOLE, T. W.
6379*
POPP, F. A.
6269*
PORTA, C.
6369
PORTER, I. H.
6437*
PORTIS, J.
6331*
POSTE, G.
6136*
POTHIER, L.
6079*
POTT, F.
6073*
POULAKOS, L.
6509
POULSEN, L. L.
6186*
POUND, A. W.
6208*
POUR, P.
6163, 6432
POVLSEN, C. O.
6376
POWERS, G. E.
6241*
POWERS, M. B.
6211*
PRABHAKAR, B. R.
6494
PRABHAKAR, H.
6494
PRAJDA, N.
6562
PRASANNA, H. R.
6139, 6168*
PRAVTCHEVA, D.
6414
PRECHTEL, K.
6496
PREHN, L. M.
6388*
PREUD'HOMME, J. L.
6098*
PREUSSMANN, R.
6220*
PRICE, P. J.
6327*
PRIESTER, W. A.
6433
PROCTOR, J. W.
6391*
PRUNIERAS, M.
6029
PRUZANSKI, W.
6349
PUFFER, H. W.
6523*
PURCHASE, I. F.
6193*
PUUMALA, R. R.
6410
QUALTIERE, L. F.
6321*
QUINN, P.
6474*
QUINTART, J.
6587*
RABSON, A. S.
6337*
RAITH, L.
6354
RAJALAKSHMI, S.
6142
RAMANATHAN, R.
6142
RAMOT, B.
6340*
RANCE, R. J.
6384*
RANDT, A.
6454*
RAO, G. R.
6511
RAO, K. R.
6181*
RAPP, F.
6084*, 6087*, 6316, 6317
RAPP, H. J.
6198*, 6199*
RASHEED, S.
6293
RATH, F. W.
6157
RATKIEWICZ, A.
6553, 6554
RAWLS, R. L.
6518
REAGAN, J. W.
6152
REDDI, K. K.
6556
REDMANN, K.
6370

* INDICATES A PLAIN CITATION WITHOUT ACCOMPANYING ABSTRACT

REDMOND, C. K.
6515
REED, S. I.
6297
REGEL, K.
6246*
REGNIER, M.
6029
REHNBERG, B. F.
6243*
REICHEL, J.
6467*
REICHMANN, G.
6569
REMACLE-BONNET, M. M.
6384*
REMINGTON, J. S.
6365
RENAUD, A.
6497
RICE, D. H.
6274*
RICH, M. A.
6355
RICHARDS, O. C.
6322*
RICHTER, W.
6408
RIFKIN, D.
6129*
RIFKIN, D. B.
6590*
RININGER, B.
6486*
RITTER, M. A.
6272*
ROBB, R.
6380*
ROBBINS, J. H.
6239
ROBBINS, P. W.
6592*
ROBERTS, J. J.
6010, 6222*
ROBERTS, M. M.
6444*
ROBERTS, R. M.
6548
ROBERTS, W. C.
6399
ROBERTSON, K. A.
6213*
ROBINS, R. A.
6092*
ROCKETTE, H. E.
6515
ROIZMAN, B.
6083*
ROLLER, P. P.
6145
ROLON, P. A.
6493
ROOS, B. A.
6538
ROPERS, H. H.
6401
ROSCHLAU, G.
6495
ROSS, C. E.
6152
ROSS, P.
6544
ROTH, R.
6200*
ROWDEN, G.
6391*
ROWE, W. P.
6294
ROWLAND, R. E.
6245*
ROWLANDS, D.
6390*
ROWLEY, J. D.
6415
ROZENGURT, E.
6589*
ROZIJN, T. H.
6309
ROZOVSKAYA, I. A.
6188*
RUBIN, I.
6174*
RUCKER, M.
6351
RUDIGER, K. D.
6467*
RUDOLPH, M.
6021, 6288, 6454*
RUHLAND, D.
6299
RUSSELL, D. H.
6558
RUSSELL, J. J.
6242*
RUSSFIELD, A. G.
6047*
RYAN, D.
6204*
SAITO, E.
6565
SAKULA, A.
6394
SALAS, J.
6550
SALAS, M. L.
6550
SALTOUN, R.
6345
SALVAGGIO, J.
6392*
SAMPSON, C. C.
6504
SAN, R. H.
6032*
SANTORO, D.
6473*
SARMA, D. S.
6142
SAVAGE, J. R.
6212*
SCAPOLI, G. L.
6409
SCAPPATICCI, S.
6482*
SCHAEFER-RIDDER, M.
6204*
SCHAPIRA, F.
6559
SCHARFF, M. D.
6024
SCHECHTER, B.
6362
SCHECHTER, I.
6352
SCHENKEN, J. R.
6527*
SCHENMETZLER, C.
6421
SCHER, C. D.
6291
SCHICK, J.
6307
SCHLATTER, C.
6005
SCHLIPKOTER, H. W.
6060*, 6061*, 6062*, 6520
SCHLOSSMAN, S.
6380*
SCHMAHL, D.
6045*, 6220*
SCHMOYER, H.
6248*
SCHNEBLI, H. P.
6591*
SCHNEIDER, R. D.
6300
SCHNEIDER, S.
6407
SCHORMAIR, S.
6194*
SCHOTTENFELD, D.
6107*
SCHRAMM, T.
6302
SCHRAUZER, G. N.
6532*, 6534*
SCHREIBER, D.
6159
SCHRIEWER, H.
6183*
SCHROEDER, T. M.
6491
SCHROTER, W.
6456*
SCHROY, C. B.
6256*
SCHUBERT, H.
6354
SCHUBERT, J.
6495
SCHULTE-HOLTHAUSEN, H.
6018
SCHULTZ, A.
6296
SCHULZE, B.
6571, 6572
SCHUMANN, E.
6467*
SCHUMM, D. E.
6366
SCHWANZ-PFITZNER, I.
6325*
SCOLNICK, E. M.
6291

SCRABA, D. G.
6326*
SEEGERS, J. C.
6144
SEIFTER, E.
6016
SELIGMANN, M.
6098*
SELIKOFF, I. J.
6514
SELKIRK, J.
6199*
SEPPALA, K.
6447*
SEVANKAEV, A. V.
6234
SHABAD, L. M.
6537*
SHANABRUCH, W. G.
6570
SHANK, P. R.
6322*
SHANMUGAM, G.
6306
SHAW, C. R.
6226*
SHAW, H. M.
6406
SHENEFELT, R. E.
6115*
SHEPARD, J. S.
6423
SHERLOCK, P.
6107*
SHERTON, C. C.
6287
SHERWOOD, M. J.
6524*
SHILS, M. E.
6059*
SHIMA, S.
6227*
SHIMIZU, S.
6429
SHIMOSATO, Y.
6374, 6375
SHINKARENKO, V. S.
6436*
SHIRAI, T.
6158
SHIVDE, A. V.
6511
SHUGAR, D.
6323*
SHUMAKER, R. C.
6213*
SHUSTIK, C.
6349
SIEGLER, R.
6291
SIERADZKI, J.
6502
SILVERS, W. K.
6379*
SILVERSTEIN, E.
6417
SIMMONS, E.
6265*
SIMPSON, B. J.
6223*
SIMPSON, J. L.
6113*
SIMS, P.
6203*
SIROVER, M. A.
6578*
SIURALA, M.
6447*
SIURIN, V. N.
6022
SKOTINICK, A. B.
6387*
SKREB, N.
6130*
SLAVINSKI, E. A.
6566
SMALL, D. M.
6068*
SMETANA, K.
6363
SMIRNOVA, I. A.
6284
SMITH, C. J.
6124*
SNYDER, S. P.
6433
SOCHOR, H.
6370
SOLT, D.
6044*
SOMEREN, A.
6461*
SONIS, S. T.
6356
SONNICHSEN, N.
6235
SORENSON, G. D.
6423
SOTO, E.
6190*
SPARGO, B. H.
6319
SPECK, B.
6395
SPEIER, J.
6146
SPENCER, C. J.
6583*
SPICER, S. S.
6455*
SPIES, F.
6309
SPINA, C. A.
6313
SPJUT, H. J.
6151
SPRIGGS, A. I.
6119*
SPRINGER, T.
6380*
STACHURA, J.
6502
STADEL, B. V.
6535*
STAFFORD, J.
6052*
STANBRIDGE, E. J.
6426
STANECK, L. D.
6381*
STARK, G. R.
6297
STEHNEY, A. F.
6245*
STEIGBIGEL, R. T.
6365
STEIGLEDER, G. K.
6403
STELOS, P.
6356
STEPHENSON, J. R.
6295
STEVENS, L. C.
6489*
STEVENSON, D. E.
6223*
STEWART, B. W.
6170*
STICH, H. F.
6032*, 6065*
STILLWELL, W. G.
6191*
STOCKERT, E.
6346
STOLIER, A. J.
6373
STOLTZFUS, C. M.
6289
STONE, M. K.
6152
STORER, J. B.
6250*
STOUT, D. L.
6226*
STRAUB, O. C.
6303
STROMINGER, J. L.
6380*
STUMP, A. J.
6169*
STYLES, J. A.
6193*
SUBJECK, J. R.
6574
SUGIHARA, S.
6158
SUGIMURA, T.
6056*
SUNDBERG, R. D.
6448*
SUNDERMAN, F. W.
6006
SUSSMAN, H. H.
6585*
SVAJGER, A.
6130*
SVEDMYR, E.
6361
SVET-MOLDAVSKY, G. J.
6377
SWENBERG, J. A.
6224*
SWIFT, M.
6434*

SZNAPKA, Z.
6502
SZPIRER, C.
6546
SZPIRER, J.
6546
SZYBINSKI, Z.
6502
TACHIBANA, S.
6252*
TAKAHASHI, K.
6506
TAKAHASHI, M.
6339*
TAKAHASHI, T.
6346
TAKASUGI, M.
6028
TAKAZAWA, H.
6429
TAKEBE, H.
6118*, 6247*
TAKTE, D. G.
6462*
TAN, M. H.
6225*
TANAKA, K.
6247*
TANAKA, Y.
6227*
TANENBAUM, L.
6266*
TATSUMI, M.
6247*
TAYLOR, A. A.
6536*
TAYLOR, H. W.
6218*
TAYLOR, J. H.
6580*
TERASAKI, P. I.
6028, 6383*
TERESHCHENKO, I. P.
6430, 6561
TERESKY, A. K.
6129*
TERHORST, C.
6380*
TERRACINI, B.
6058*
TERZAGHI, M.
6263*
THEMANN, H.
6299
THIELE, J.
6457*
THOMAS, P.
6348
THOMSON, D. M.
6391*
THORHORST, J.
6395
THORNTON, H.
6549
THUMB, N.
6167
TILGEN, D.
6491
TILL, J. E.
6244*
TILZER, L. L.
6351
TODD, P.
6256*
TOMATIS, L.
6035*
TRALKA, T. S.
6337*
TREVES, A. J.
6362
TRIMBLE, B. K.
6069*
TRUMBORE, C. N.
6248*
TRUX, F.
6467*
TSANEVA, R.
6414
TSCHOLL, R.
6450*
TSUDA, H.
6158
TUBIANA, M.
6497
TUSCHL, H.
6238
TYRER, L. B.
6231*
UERDINGEN, R.
6403
ULLRICH, R. L.
6250*
URANO, M.
6275*
URBACH, F.
6264*
URBAN, P.
6411
VAKAET, L.
6539
VALLADARES, Y.
6298
VAN ANDA, J.
6201*
VAN DEN BERG, F. W.
6440*
VAN DONGEN, K.
6190*
VAN VLOTEN, W. A.
6438*
VARDIMAN, J.
6415
VARMUS, H. E.
6322*
VASCONCELOS-COSTA, J.
6342*
VASILIEV, J. M.
6036*
VAUGHAN, M. H.
6333*
VENKITASUBRAMANIAN, T. A.
6139, 6168*
VERNIER, R. L.
6458*
VERNON, M. L.
6327*
VESSELINOVITCH, S. D.
6265*
VISWANATHAN, L.
6139, 6168*
VLAK, J. M
6309
VLASTIBOROVA, A.
6363
VOELKER, R. W.
6211*
VOEVODIN, A. F.
6335*
VOGEL, F.
6491
VONSOVER, A.
6340*
VORMITTAG, W.
6166
VORONIN, V. M.
6155
VRBA, M.
6404
VUOPIO, P.
6449*
VYKOUPIL, K. F.
6457*
WACHTEL, S. S.
6379*
WACHTMEISTER, C. A.
6217*
WADA, Y.
6165
WADSWORTH, S.
6083*
WAGGONER, C. D.
6562
WAGNER, W.
6048*
WAGONER, J. K.
6273*
WALDMANN, T. A.
6350
WALDREN, C.
6249*
WALDRON, H. A.
6004
WALKER, A. R.
6105*
WALKER, C.
6249*
WALLACE, R.
6280
WALLIN, J. D.
6229*
WARD, J. F.
6254*, 6259*
WARING, R. H.
6150
WARNER, N. E.
6523*
WARR, G. A.
6173*
WATANABE, I.
6240*
WATANABE, M.
6070*
WATANABE, P. G.
6154, 6206*, 6207*

WATSON, G. E.
6212*
WATTENBERG, L. W.
6146
WEBER, G.
6562
WEBER, M. J.
6281
WEHNER, A. P.
6179*
WEHRLY, K.
6331*
WEILAND, F.
6303
WEISS, L.
6136*, 6574
WEISS, W.
6529*
WEITZMAN, S.
6024
WELSH, R. M.
6282
WENTZ, W. B.
6152
WERNER, H.
6507
WESSEL, H.
6159
WEST, S. B.
6204*
WESTBY, S.
6427
WESTMORELAND, D.
6087*
WESTPHAL, H.
6308
WESTWOOD, F. R.
6193*
WESTWORD, J. H.
6348
WHAUN, J. M.
6419
WHEELER, K. T.
6270*
WHITLOCK, J. P.
6199*
WIDERMANN, B.
6411
WIDMAIER, R.
6288
WIEBEL, F. J.
6199*
WIEDERMANN, D.
6411
WIENER, F.
6546
WIENKER, T. F.
6401
WILLIAMS, D. C.
6394
WILLIAMS, J.
6080*, 6262*
WILLIAMS, J. C.
6562
WILLIAMS, J. R.
6267*
WILLIAMSON, J.
6108*
WILLOUGHBY, M. L.
6127*
WILMANNS, W.
6090*
WILSON, R. E.
6356
WINAWER, S. J.
6107*
WINGER, L.
6390*
WINGHAM, J.
6412, 6413
WINKELHAKE, J. L.
6431
WINNACKER, E. L.
6307
WITT, K.
6507
WITTER, R. L.
6015
WLODARSKI, K.
6428
WOLD, W. S.
6306
WOLF, H.
6018
WOLF, O.
6516
WONG, T. W.
6443*, 6479*
WOOD, A. W.
6204*
WOOLVERTON, D. K.
6582*
WORSDORFER, O.
6450*
WRIGHT, J. F.
6243*
WU, A. M.
6296
WU, M.
6305
WURSTER-HILL, D. H.
6423
WYKE, J. A.
6279
WYNDER, E.
6228*
WYNDER, E. L.
6003, 6057*
YAJIMA, Y.
6311
YAMAMOTO, N.
6314
YANG, S. K.
6145, 6199*
YASUE, H.
6339*
YAU, T. M.
6281
YOKOTA, H.
6544
YOON, J. W.
6324*
YOSHIDA, S.
6251*
YUAN, B. O.
6548
ZARETSKAIA, I. S.
6561
ZARETSKAYA, I. S.
6430
ZEIGEL, R.
6079*
ZEIGEL, R. F.
6318
ZELLER, W. J.
6160
ZENNER, B. D.
6581*
ZHALGASBAYEVA, G. T.
6378
ZIEGEL, R. F.
6320
ZIEGLER, D. M.
6186*
ZIMMERMAN, B.
6385*
ZINKHAM, W. H.
6446*
ZINZAR, S. N.
6377
ZIOLA, B. R.
6326*
ZIV, E.
6352
ZMUDZKA, B.
6323*
ZULCH, K. J.
6053*
ZUR HAUSEN, H.
6018

- ABNORMALITIES
  - ANEMIA, APLASTIC
    - GENETICS, 6491

- ACETAMIDE, 2-IODO-
  - VIRUS, POLIO
    - VIRAL PROTEINS, 6336*
  - VIRUS, RHINO 2
    - VIRAL PROTEINS, 6336*

- ACETAMIDE, N-(ACETYLOXY)-N-9H-FLUOREN-2-YL-
  - CAFFEINE
    - DNA REPAIR, 6222*

- ACETAMIDE, N-FLUOREN-2-YL-
  - ADENYL CYCLASE
    - ADRENERGIC STIMULATION, 6141
    - GLUCAGON, 6141
  - CELL TRANSFORMATION, NEOPLASTIC
    - DNA, 6041*
    - REVIEW, 6044*

- ACETAMIDE, THIO-
  - LIVER
    - PHOSPHOLIPIDS, 6183*
  - MICROSOMES, LIVER
    - PHOSPHOLIPIDS, 6183*
  - MITOCHONDRIA, LIVER
    - PHOSPHOLIPIDS, 6183*
  - SILYMARIN
    - PHOSPHOLIPIDS, 6183*

- ACETIC ACID, (2,4-DICHLOROPHENOXY)-
  - PEROXIDASES
    - RNA, BINDING, 6177*

- ACETIC ANHYDRIDE
  - VIRUS, POLIO
    - VIRAL PROTEINS, 6336*
  - VIRUS, RHINO 2
    - VIRAL PROTEINS, 6336*

- ACETOHYDROXAMIC ACID, N-FLUOREN-2-YL-
  - DNA
    - BINDING, LIVER, 6142
  - LIVER
    - CARCINOGENIC METABOLITE, 6226*
    - METABOLISM, RAT, 6226*

- ACETYLAMINOFLUORENE
  - SEE ACETAMIDE, N-FLUOREN-2-YL-

- ACID PHOSPHATASE
  - BRAIN NEOPLASMS
    - UREA, ETHYL NITROSO-, 6157
  - LEUKEMIA, MYELOCYTIC
    - CELL DIFFERENTIATION, 6409

- ACROMEGALY
  - PITUITARY NEOPLASMS
    - EPIDEMIOLOGY, REVIEW, 6101*

- ACRYLAMIDE, 2-(2-FURYL)-3-(5-NITRO-2-FURYL)-
  - ESCHERICHIA COLI
    - SCREENING METHOD, 6184*
  - FOOD CONTAMINATION
    - REVIEW, 6056*

- ACTINOMYCIN
  - VIRUS, ROUS SARCOMA
    - PLASMINOGEN, 6590*

- ACTINOMYCIN D
  - DNA, MITOCHONDRIAL
    - DNA REPLICATION, 6551

- ADENOCARCINOMA
  - ANTIGENIC DETERMINANTS
    - IMMUNE RESPONSE, REVIEW, 6095*
  - ANTIGENS, NEOPLASM
    - IMMUNITY, CELLULAR, REVIEW, 6095*
  - BLOOD GROUPS
    - EPIDEMIOLOGY, 6510
  - CERVIX NEOPLASMS
    - CONNECTIVE TISSUE, HISTOLOGICAL STUDY, 6475*
  - COLONIC NEOPLASMS
    - CELLS, CULTURED, 6225*
    - HYDRAZINE, 1,2-DIMETHYL-, 6225*
    - LACTATE DEHYDROGENASE ISOENZYMES, 6560
    - NEOPLASM TRANSPLANTATION, 6225*
  - DUODENAL NEOPLASMS
    - FRUCTOSEDIPHOSPHATE ALDOLASE, 6559
    - GUANIDINE, 1-METHYL-3-NITRO-1-NITROSO-, 6559
  - GASTROINTESTINAL NEOPLASMS
    - NAPHTHALENE, 6516
    - TRANSPLANTATION, HETEROLOGOUS, 6376
  - KIDNEY NEOPLASMS
    - DIMETHYLAMINE, N-NITRO-, 6180*
  - LUNG NEOPLASMS
    - MONOCROTALINE, 6213*
  - MAMMARY NEOPLASMS, EXPERIMENTAL
    - IMMUNE RESPONSE, NEWBORN AND ADULT MOUSE, 6377
    - IMMUNITY, CELLULAR, 6367
  - NOSE NEOPLASMS
    - OCCUPATIONAL HAZARD, REVIEW, 6001
  - OVARIAN NEOPLASMS
    - IMMUNE RESPONSE, NEWBORN AND ADULT MOUSE, 6377
  - RESPIRATORY TRACT NEOPLASMS
    - EPIDEMIOLOGY, HAMSTER, 6432
  - STOMACH NEOPLASMS
    - GUANIDINE, 1-METHYL-3-NITRO-1-NITROSO-, 6156
    - LACTATE DEHYDROGENASE ISOENZYMES, 6560
    - PROTEINS, 6549
    - TETRACYCLINE, 7-CHLORO-6-DEMETHYL-, 6549
  - THYROID NEOPLASMS
    - EPIDEMIOLOGY, POLAND, 6502
    - NEOPLASM METASTASIS, 6473*

- ADENOMA
  - ADRENAL GLAND NEOPLASMS
    - MONOCROTALINE, 6213*
    - STEROIDS, REVIEW, 6102*
  - GASTROINTESTINAL NEOPLASMS
    - GENETICS, 6469*
  - LIVER NEOPLASMS
    - CASE REPORT, 6151
    - CONTRACEPTIVES, ORAL, 6151
    - DIAGNOSIS AND CLASSIFICATION, 6151

  - SEBACEOUS GLAND NEOPLASMS
    - ULTRASTRUCTURAL STUDY, 6299
    - VIRUS-LIKE PARTICLES, 6299
  - THYROID NEOPLASMS
    - THYROTROPIN, 6565

- ADENOMA, CHROMOPHOBE
  - PITUITARY NEOPLASMS
    - EPIDEMIOLOGY, REVIEW, 6101*

- ADENOMA, EOSINOPHILIC
  - PITUITARY NEOPLASMS
    - EPIDEMIOLOGY, REVIEW, 6101*

- ADENOMATOSIS, FAMILIAL ENDOCRINE
  - NERVOUS SYSTEM NEOPLASMS
    - AUTOSOME ABNORMALITIES, REVIEW, 6117*

- ADENOSINE CYCLIC 3',5' MONOPHOSPHATE
  - ADENYL CYCLASE
    - PARENCHYMAL CELLS, LIVER, RAT, 6141
  - CELL MEMBRANE
    - CELL TRANSFORMATION, NEOPLASTIC, REVIEW, 6136*
  - MELANOMA
    - ENZYMATIC ACTIVITY, 6600*
    - GROWTH, 6600*
    - GROWTH AND PIGMENTATION, REVIEW, 6600*
    - MSH, 6600*
  - MICROTUBULES
    - RADIATION EFFECTS, HAIR FOLLICLES, MOUSE, 6258*
  - RADIATION, IONIZING
    - MICROTUBULES, 6258*
  - SARCOMA, OSTEOGENIC
    - PARATHYROID HORMONE, 6567
    - PHOSPHATE, 6567

- ADENOSINE TRIPHOSPHATASE
  - EPITHELIAL CELLS
    - CELL MEMBRANE, 6588*
    - CELL TRANSFORMATION, NEOPLASTIC, 6588*

- ADENYL CYCLASE
  - ACETAMIDE, N-FLUOREN-2-YL-
    - ADRENERGIC STIMULATION, 6141
    - GLUCAGON, 6141
  - ADENOSINE CYCLIC 3',5' MONOPHOSPHATE
    - PARENCHYMAL CELLS, LIVER, RAT, 6141
  - LEUKEMIA, LYMPHOCYTIC
    - CELL DIFFERENTIATION, 6596*

- ADRENAL CORTEX HORMONES
  - ADRENAL GLAND NEOPLASMS
    - EPIDEMIOLOGY, REVIEW, 6102*
  - CORTICOTROPIN
    - CELL DIFFERENTIATION, 6566
    - STEROIDS, 6566
    - TISSUE CULTURE, 6566
  - FIBROSARCOMA
    - CHOLANTHRENE, 3-METHYL-, 6227*
    - NEOPLASM TRANSPLANTATION, 6227*

- ADRENAL GLAND NEOPLASMS
  - ADENOMA
    - MONOCROTALINE, 6213*
    - STEROIDS, REVIEW, 6102*
  - ADRENAL CORTEX HORMONES
    - EPIDEMIOLOGY, REVIEW, 6102*
  - ALDOSTERONE
    - EPIDEMIOLOGY, REVIEW, 6102*
  - CARCINOMA
    - STEROIDS, REVIEW, 6102*
  - CUSHING'S SYNDROME
    - EPIDEMIOLOGY, REVIEW, 6102*
    - STEROIDS, REVIEW, 6102*
  - HORMONES
    - NEOPLASMS, EXPERIMENTAL, REVIEW, 6047*

- AFLATOXIN B1
  - ACETIC ACID, IODO-
    - ACETATE INCORPORATION, 6168*
  - ARSENIOUS ACID, SODIUM SALT
    - ACETATE INCORPORATION, 6168*
  - ASPERGILLUS FLAVUS
    - ACETATE INCORPORATION, 6168*
  - BARBITURIC ACID, 5-ETHYL-5-PHENYL-
    - BINDING, LIVER, 6172*
    - RNA POLYMERASE, 6172*
    - RNA REPLICATION, 6172*
  - BENZOIC ACID, P-NITRO-
    - ACETATE INCORPORATION, 6168*
  - CARCINOGENIC METABOLITE
    - REVIEW, 6040*
  - CELL TRANSFORMATION, NEOPLASTIC
    - REVIEW, 6041*
  - CHROMATIN
    - BINDING, 6139
    - LIVER, RAT, 6139
  - CHROMOSOMES
    - CELL TRANSFORMATION, NEOPLASTIC, REVIEW, 6120*
  - GASTROINTESTINAL NEOPLASMS
    - FOOD CONTAMINATION, 6058*
  - LIVER NEOPLASMS
    - HISTOLOGICAL STUDY, 6140
    - NECROSIS, 6140
  - MALONIC ACID
    - ACETATE INCORPORATION, 6168*
  - NUCLEIC ACIDS
    - LIVER, RAT, 6140
  - PHENOL, 2,4-DINITRO-
    - ACETATE INCORPORATION, 6168*
  - SALICYLIC ACID, 4-AMINO-
    - ACETATE INCORPORATION, 6168*
  - SODIUM FLUORIDE
    - ACETATE INCORPORATION, 6168*
  - TETRAHYMENA PYRIFORMIS
    - PHOTOTOXIC EFFECTS, 6147

- AFLATOXIN G1
  - CHROMATIN
    - BINDING, 6139
    - LIVER, RAT, 6139

- AGAMMAGLOBULINEMIA

- B-LYMPHOCYTES
  - CELL DIFFERENTIATION, 6350
- T-LYMPHOCYTES
  - ANTIBODY FORMATION, 6350
  - PLASMA CELLS, 6350

AGING
- CELL TRANSFORMATION, NEOPLASTIC
  - HYBRID CELLS, 6426
- FIBROBLASTS
  - HYBRID CELLS, 6426

AGROBACTERIUM TUMEFACIENS
- PLANT TUMORS
  - DNA, BACTERIAL, 6169*
  - DNA-DNA HYBRIDIZATION, 6169*

AIR POLLUTION
- ASBESTOS
  - CARCINOGENIC POTENTIAL, 6062*
- BENZ(A)ANTHRACENE, 7,12-DIMETHYL-
  - CARCINOGENIC POTENTIAL, 6060*
- BENZ(E)ACEPHENANTHRYLENE
  - CARCINOGENIC POTENTIAL, 6060*
- BENZO(A)PYRENE
  - CARCINOGENIC POTENTIAL, 6060*, 6062*
- ETHYLENE, CHLORO-
  - ANGIOSARCOMA, 6060*
  - CARCINOGENIC POTENTIAL, 6060*
- FIBERS
  - CARCINOGENIC POTENTIAL, 6061*
- OZONE
  - CARCINOGENIC POTENTIAL, 6062*

ALANINE
- DNA, MITOCHONDRIAL
  - DNA REPLICATION, 6551

ALCOHOL DRINKING
- LIVER NEOPLASMS
  - EPIDEMIOLOGY, 6534*
  - STATISTICAL ANALYSIS, 6534*
- MOUTH NEOPLASMS
  - EPIDEMIOLOGY, 6534*
  - STATISTICAL ANALYSIS, 6534*

ALCOHOL OXIDOREDUCTASES
- VIRUS, ROUS SARCOMA
  - GLYCOPROTEINS, 6279

ALDOSTERONE
- ADRENAL GLAND NEOPLASMS
  - EPIDEMIOLOGY, REVIEW, 6102*

ALDRIN
- FORMAMIDINE, N'-(4-CHLORO-O-TOLYL)-N,N-DIMETHYL-
  - RETENTION, 6216*

ALKALINE PHOSPHATASE
- HELA CELLS
  - ISOENZYMES, 6585*
- HEPATOMA
  - CELL CYCLE KINETICS, 6587*
  - ISOENZYMES, 6585*
- LEUKEMIA, MYELOCYTIC
  - DIAGNOSIS AND TREATMENT, REVIEW, 6128*

ALKYLATING AGENTS
- DNA
  - MUTAGENIC ACTIVITY, REVIEW, 6043*
- NERVOUS SYSTEM NEOPLASMS
  - NEOPLASM TRANSPLANTATION, 6053*
  - REVIEW, 6053*

ALLOANTIGENS
- GRAFT REJECTION
  - RADIATION CHIMERA, 6379*
- RADIATION, IONIZING
  - GRAFT REJECTION, 6379*

ALPHA PARTICLES
- LUNG
  - CARCINOGENIC POTENTIAL, REVIEW, 6074*
- PLUTONIUM OXIDE
  - CARCINOGENIC POTENTIAL, REVIEW, 6074*

ALPHA-AMANITINE
- LEUKEMIA, LYMPHOCYTIC
  - RNA POLYMERASE, 6557

AMARANTH
- GASTROINTESTINAL NEOPLASMS
  - FOOD CONTAMINATION, 6058*

AMINO ACIDS
- ARSENIC ACID, DISODIUM SALT
  - LYMPHOCYTES, 6547
- CARCINOEMBRYONIC ANTIGEN
  - ANTIGEN-ANTIBODY REACTIONS, 6348
  - CHEMICAL MODIFICATION, 6348
- VIRUS, MENGO
  - PEPTIDES, 6326*

AMINO ACYL T RNA SYNTHETASES
- LEUKEMIA
  - ENZYMATIC ACTIVITY, LEUKOCYTES, 6582*

AMINOPEPTIDASES
- LEUKEMIA, MYELOCYTIC
  - CELL DIFFERENTIATION, 6409

AMINOTRANSFERASES
- CARCINOMA 256, WALKER
  - LIVER, 6572

AMOSITE
- SEE ASBESTOS

AMYLOIDOSIS
- HYALIN SUBSTANCE
  - ULTRASTRUCTURAL STUDY, 6400
- MELANOMA
  - HYALIN SUBSTANCE, 6400

ANDROGENS
- TESTICULAR NEOPLASMS
  - BIOCHEMICAL STUDY, REVIEW, 6111*

ANEMIA, APLASTIC
- ABNORMALITIES
  - GENETICS, 6491
- AGE FACTORS
  - GENETICS, 6491

- CAFFEINE
  - CHROMOSOME ABERRATIONS, 6434*
- CELL TRANSFORMATION, NEOPLASTIC
  - CHROMOSOME ABNORMALITIES, REVIEW, 6121*
  - EPIDEMIOLOGY, 6434*
  - EPIDEMIOLOGY, REVIEW, 6122*
- CHLORAMPHENICOL
  - CHROMOSOME ABERRATIONS, 6434*
- CHROMOSOME ABERRATIONS
  - GENETICS, 6491
- CHROMOSOME ABNORMALITIES
  - DIAGNOSIS AND PROGNOSIS, REVIEW, 6122*
- DIABETES MELLITUS
  - EPIDEMIOLOGY, 6434*
- DIGESTIVE SYSTEM NEOPLASMS
  - GENETICS, 6420
- GASTROINTESTINAL NEOPLASMS
  - CHROMOSOME ABNORMALITIES, REVIEW, 6121*
- GENETICS
  - CASE REPORT, 6420, 6491
  - CHROMOSOME ABNORMALITIES, 6421
  - CHROMOSOMES, HUMAN, 16-18, 6421
  - DIAGNOSIS AND PROGNOSIS, REVIEW, 6122*
  - EPIDEMIOLOGY, 6434*
- LEUKEMIA
  - CHROMOSOME ABNORMALITIES, REVIEW, 6121*
- LEUKEMIA, LYMPHOBLASTIC
  - GENETICS, 6420
- METHANESULFONIC ACID, ETHYL ESTER
  - CHROMOSOME ABERRATIONS, 6434*
- MITOMYCIN C
  - CHROMOSOME ABERRATIONS, 6434*
- RADIATION, IONIZING
  - CHROMOSOME ABERRATIONS, 6434*
- SARCOMA, OSTEOGENIC
  - GENETICS, 6420
- SEX FACTORS
  - GENETICS, 6491
- ULTRAVIOLET RAYS
  - CHROMOSOME ABERRATIONS, 6434*

ANEMIA, FANCONI'S
- SEE ANEMIA, APLASTIC

ANEMIA, HEMOLYTIC
- NEUTRONS
  - DNA REPAIR, SPLEEN, 6238
- RADIATION, IONIZING
  - DNA REPAIR, SPLEEN, 6238
- ULTRAVIOLET RAYS
  - DNA REPAIR, SPLEEN, 6238

ANEMIA, HEMOLYTIC, AUTOIMMUNE
- VIRUS, FRIEND MURINE LEUKEMIA
  - ANTIGENIC DETERMINANTS, 6330*
  - AUTOANTIBODIES, 6330*
  - ERYTHROCYTES, 6330*
  - IMMUNE RESPONSE, 6330*

ANEMIA, MACROCYTIC
- FOLIC ACID
  - CONTRACEPTIVES, ORAL, 6152

ANGIOBLASTOMA
- SEE ANGIOSARCOMA

ANGIOKERATOMA CORPORIS DIFFUSUM
- HAIR
  - GALACTOSIDASES, 6401
- HETEROZYGOTE
  - HAIR ROOT ANALYSIS, 6401

ANGIOMATOSIS
- NERVOUS SYSTEM NEOPLASMS
  - AUTOSOME ABNORMALITIES, REVIEW, 6117*

ANGIOSARCOMA
- BENZ(A)ANTHRACENE, 7,12-DIMETHYL-
  - CARCINOMA, 6060*
  - SARCOMA, 6060*
- BENZ(E)ACEPHENANTHRYLENE
  - CARCINOMA, 6060*
  - SARCOMA, 6060*
- BENZO(A)PYRENE
  - CARCINOMA, 6060*
  - SARCOMA, 6060*
- DIGESTIVE SYSTEM NEOPLASMS
  - EPIDEMIOLOGY, HAMSTER, 6432
- ETHYLENE, CHLORO-
  - AIR POLLUTION, 6060*
  - CARCINOGENIC POTENTIAL, REVIEW, 6005
- NEOPLASM TRANSPLANTATION
  - C-TYPE PARTICLES, 6302

ANGIOTENSINASE
- SARCOIDOSIS
  - ENZYMATIC ACTIVITY, LYMPH NODES, 6417

ANILINE, N-METHYL-N-NITROSO-
- ESOPHAGEAL NEOPLASMS
  - ANIMAL MODEL, RAT, 6215*
  - BLEOMYCIN, 6215*
  - CARCINOMA, EPIDERMOID, 6215*

ANILINE, N,N-DIMETHYL-P-PHENYLAZO-
- DIETHYLAMINE, N-NITROSO-
  - HEPATECTOMY, 6181*
  - OXIDATIVE PHOSPHORYLATION, 6181*
- HEPATOMA
  - HISTOLOGICAL STUDY, MOUSE, 6143
- RADIATION, IONIZING
  - OXIDATIVE PHOSPHORYLATION, 6181*

ANTHOPHYLLITE
- SEE ASBESTOS

ANTIBODIES
- LEUKEMIA, MYELOBLASTIC
  - DNA, SINGLE STRANDED, 6382*
- LEUKEMIA, MYELOCYTIC
  - DNA, SINGLE STRANDED, 6382*
- LYMPHOMA
  - DNA, SINGLE STRANDED, 6382*
- ULTRAVIOLET RAYS
  - DNA REPAIR, 6254*
  - NUCLEOPROTEINS, 6254*
  - PYRIMIDINES, 6254*

ANTIBODIES, NEOPLASM
- MELANOMA

- BINDING, 6391*

ANTIBODIES, VIRAL
- BURKITT'S LYMPHOMA
  - VIRUS, EPSTEIN-BARR, 6340*
- LYMPHOSARCOMA
  - VIRUS, EPSTEIN-BARR, 6340*
- VIRUS, BOVINE LEUKEMIA
  - ANTIGEN-ANTIBODY REACTIONS, 6303
  - IMMUNE SERUMS, 6303
- VIRUS, EPSTEIN-BARR
  - CELL TRANSFORMATION, NEOPLASTIC, 6314
  - IMMUNITY, CELLULAR, 6313
- VIRUS, MAREK'S DISEASE HERPES
  - IMMUNE RESPONSE, REVIEW, 6015

ANTIBODY FORMATION
- AGAMMAGLOBULINEMIA
  - T-LYMPHOCYTES, 6350
- ANTIGENS, HETEROGENETIC
  - BENZENESULFONIC ACID, 2,4,6-TRINITRO-, 6345
  - GLUTARALDEHYDE, 6345
- HYPERGAMMAGLOBULINEMIA
  - VIRUS, AVIAN LEUKOSIS, 6321*
  - VIRUS, INFLUENZA, 6321*
- LYMPHOMA
  - IMMUNE SERUMS, 6356
- MULTIPLE MYELOMA
  - MONOCYTES, 6350
- VIRUS, FELINE LEUKEMIA
  - VIRAL PROTEINS, 6329*
- VIRUS, MURINE LEUKEMIA
  - VIRAL PROTEINS, 6329*
- VIRUS, RD-114
  - VIRAL PROTEINS, 6329*

ANTIBODY SPECIFICITY
- T-LYMPHOCYTES
  - MYELOMA PROTEINS, 6480*

ANTIGEN-ANTIBODY COMPLEX
- ANTIGENS, VIRAL
  - IMMUNE RESPONSE, REVIEW, 6025
- IMMUNITY, CELLULAR
  - REVIEW, 6092*
- LUPUS ERYTHEMATOSUS, SYSTEMIC
  - VIRUS, C-TYPE RNA TUMOR, 6319
- LYMPHOMA
  - IMMUNITY, CELLULAR, 6356
- NEOPLASMS
  - IMMUNE RESPONSE, REVIEW, 6025
- VIRUS, MURINE LEUKEMIA
  - CELL MEMBRANE, 6331*

ANTIGEN-ANTIBODY REACTIONS
- BURKITT'S LYMPHOMA
  - VIRUS, EPSTEIN-BARR, 6340*
- CARCINOEMBRYONIC ANTIGEN
  - AMINO ACIDS, 6348
  - 2,3-BUTANEDIONE, 6348
  - IMIDAZOLE, N-ACETYL-, 6348
  - METHANE, TETRANITRO-, 6348
  - PEROXYFORMIC ACID, 6348
  - PHENOL, 4-BROMO-2-NITRO-, 6348
- INFECTIOUS MONONUCLEOSIS
  - VIRUS, EPSTEIN-BARR, 6315
- LEUKEMIA
  - VIRUS, FELINE LEUKEMIA, 6329*
- LEUKEMIA, LYMPHOCYTIC
  - B-LYMPHOCYTES, 6385*
- MULTIPLE MYELOMA
  - BONE MARROW CELLS, 6381*
- VIRUS, BOVINE LEUKEMIA
  - ANTIBODIES, VIRAL, 6303
- VIRUS, FELINE LEUKEMIA
  - ANTIGENS, VIRAL, 6329*
- VIRUS, SV40
  - VIRUS, PAPOVA, 6337*

ANTIGENIC DETERMINANTS
- ADENOCARCINOMA
  - IMMUNE RESPONSE, REVIEW, 6095*
- ANEMIA, HEMOLYTIC, AUTOIMMUNE
  - VIRUS, FRIEND MURINE LEUKEMIA, 6330*
- B-LYMPHOCYTES
  - IGM, 6480*
  - IMMUNOGLOBULINS, SURFACE, 6480*
- T-LYMPHOCYTES
  - IGM, 6480*
  - IMMUNOGLOBULINS, SURFACE, 6480*
- MELANOMA
  - IMMUNE RESPONSE, REVIEW, 6095*
- MULTIPLE MYELOMA
  - BURKITT'S LYMPHOMA, 6381*
- NEOPLASMS
  - IMMUNE RESPONSE, REVIEW, 6025
- NEUROBLASTOMA
  - IMMUNE RESPONSE, REVIEW, 6095*
- ONCOGENIC VIRUSES
  - REVIEW, 6022
- VIRUS, BABOON C-TYPE RNA TUMOR
  - ANTIGENS, VIRAL, 6335*
  - VIRUS, RD-114, 6335*

ANTIGENS
- LEUKEMIA, LYMPHOCYTIC
  - CELL MEMBRANE, 6385*
- NEUROBLASTOMA
  - CELL DIFFERENTIATION, 6347
  - CELL MEMBRANE, 6347
- VIRUS, MURINE LEUKEMIA
  - CELL MEMBRANE, 6331*
  - T-LYMPHOCYTES, 6331*
- VIRUS, SV40
  - CELL TRANSFORMATION, NEOPLASTIC, 6297
  - ISOLATION AND CHARACTERIZATION, 6297
  - RNA, MESSENGER, 6297

ANTIGENS, HETEROGENETIC
- BENZENESULFONIC ACID, 2,4,6-TRINITRO-
  - ANTIBODY FORMATION, 6345
  - IMMUNITY, CELLULAR, 6345
  - T-LYMPHOCYTES, 6345
- GLUTARALDEHYDE
  - ANTIBODY FORMATION, 6345
  - IMMUNITY, CELLULAR, 6345
  - T-LYMPHOCYTES, 6345

ANTIGENS, NEOPLASM
- ADENOCARCINOMA
  - IMMUNITY, CELLULAR, REVIEW, 6095*
- BONE NEOPLASMS
  - NEOPLASM METASTASIS, 6373

- EPENDYMOMA
  - VIRUS, PAPOVA, 6337*
- IMMUNITY, CELLULAR
  - TISSUE CULTURE, REVIEW, 6137*
- T-LYMPHOCYTES
  - GRAFT VS HOST REACTION, REVIEW, 6096*
  - IMMUNITY, CELLULAR, REVIEW, 6096*
  - IMMUNITY, PASSIVE, REVIEW, 6096*
- LYMPHOMA
  - IMMUNITY, CELLULAR, 6356
- MELANOMA
  - IMMUNITY, CELLULAR, REVIEW, 6095*
- MULTIPLE MYELOMA
  - IMMUNE SERUMS, 6381*
- NEUROBLASTOMA
  - IMMUNITY, CELLULAR, REVIEW, 6095*
- RNA
  - CYTOTOXICITY TESTS, IMMUNOLOGIC, 6343
  - IMMUNITY, CELLULAR, 6343
- SARCOMA
  - TRANSPLANTATION IMMUNOLOGY, 6373
- TERATOID TUMOR
  - CELL DIFFERENTIATION, REVIEW, 6129*
- VIRUS, MAREK'S DISEASE HERPES
  - IMMUNITY, CELL-MEDIATED, REVIEW, 6015
- VIRUS, MOLONEY MURINE SARCOMA
  - IMMUNITY, CELLULAR, 6332*

ANTIGENS, VIRAL
- ANTIGEN-ANTIBODY COMPLEX
  - IMMUNE RESPONSE, REVIEW, 6025
- BURKITT'S LYMPHOMA
  - EPIDEMIOLOGY, REVIEW, 6082*
  - VIRUS, EPSTEIN-BARR, 6341*
- LEUKEMIA
  - VIRUS, C-TYPE, 6295
- LUPUS ERYTHEMATOSUS, SYSTEMIC
  - VIRUS, C-TYPE RNA TUMOR, 6319
  - VIRUS, HUMAN EMBRYO LUNG 12, 6319
- LYMPHATIC NEOPLASMS
  - VIRUS, C-TYPE, 6295
- MAMMARY NEOPLASMS, EXPERIMENTAL
  - VIRUS, C-TYPE, 6295
- NEOPLASMS, CONNECTIVE TISSUE
  - VIRUS, C-TYPE, 6295
- VIRUS, ADENO 12
  - CELL TRANSFORMATION, NEOPLASTIC, 6342*
  - ISOLATION AND CHARACTERIZATION, 6342*
- VIRUS, BABOON C-TYPE RNA TUMOR
  - ANTIGENIC DETERMINANTS, 6335*
  - ISOLATION AND CHARACTERIZATION, 6335*
- VIRUS, C-TYPE RNA TUMOR
  - DEXAMETHASONE, 6296
  - INTERFERON, 6296
- VIRUS, DNA TUMOR
  - CELL TRANSFORMATION, NEOPLASTIC, REVIEW, 6087*
- VIRUS, EPSTEIN-BARR
  - IMMUNITY, CELLULAR, 6313
  - LYMPHOCYTE TRANSFORMATION, 6312, 6313
  - SUPERINFECTION, RAJI CELLS, 6311
- VIRUS, FELINE LEUKEMIA
  - ANTIGEN-ANTIBODY REACTIONS, 6329*
- VIRUS, MAREK'S DISEASE HERPES
  - IMMUNITY, CELL-MEDIATED, REVIEW, 6015
- VIRUS, MURINE LEUKEMIA
  - AGE FACTORS, 6346
  - T-LYMPHOCYTES, 6346
  - PRECANCEROUS CONDITIONS, 6346

ANTILYMPHOCYTE SERUM
- CARCINOMA, EPIDERMOID
  - ULTRAVIOLET RAYS, 6264*
- ERYTHROLEUKEMIA
  - IMMUNE RESPONSE, MOUSE, 6355
  - IMMUNITY, CELLULAR, 6355
- SKIN NEOPLASMS
  - ULTRAVIOLET RAYS, 6264*
- VIRUS, MOLONEY MURINE SARCOMA
  - T-LYMPHOCYTES, 6332*

ANTINEOPLASTIC AGENTS
- CELL TRANSFORMATION, NEOPLASTIC
  - FIBROBLASTS, REVIEW, 6033*
- SPERMATOZOA
  - CHROMOSOMES, 6185*
  - MUTAGENIC ACTIVITY, 6185*

ANTIPYRINE
- BENZENE, (EPOXYETHYL)-
  - METABOLSIM, 6196*
- GENETICS
  - ARYL HYDROCARBON HYDROXYLASES, 6210*
- HALF-LIFE
  - ARYL HYDROCARBON HYDROXYLASES, 6210*
- LYMPHOCYTES
  - ARYL HYDROCARBON HYDROXYLASES, 6210*

ANTISERUM
- SEE IMMUNE SERUMS

ANTIVIRAL AGENTS
- BONE MARROW CELLS
  - MUTAGENIC ACTIVITY, 6221*
- HYDROGEN BONDS
  - SYNTHESIS, 6221*
- SPERMATOZOA
  - MUTAGENIC ACTIVITY, 6221*

ANUS NEOPLASMS
- LEUKOPLAKIA
  - CASE REPORT, 6472*
  - DIAGNOSIS AND PROGNOSIS, 6472*

ANXIETY
- LUNG NEOPLASMS
  - PERSONALITY DISORDERS, 6531*

AROCLOR 1254
- DIMETHYLAMINE, N-NITROSO-
  - MUTAGENIC ACTIVITY, 6182*
  - OXIDOREDUCTASES, 6182*

ARRHENOBLASTOMA
- OVARIAN NEOPLASMS
  - EPIDEMIOLOGY, REVIEW, 6112*

- ARSENIC
  - ANIMALS, LABORATORY
    - CARCINOGENIC ACTIVITY, REVIEW, 6006
  - ENVIRONMENTAL HAZARD
    - CARCINOGENIC POTENTIAL, REVIEW, 6049*
  - NEOPLASMS, EXPERIMENTAL
    - CARCINOGENIC POTENTIAL, REVIEW, 6049*
  - RESPIRATORY TRACT NEOPLASMS
    - DOSE-RESPONSE STUDY, 6048*
    - EPIDEMIOLOGY, 6048*
    - EPIDEMIOLOGY, REVIEW, 6006
    - OCCUPATIONAL HAZARD, 6048*
  - SKIN NEOPLASMS
    - EPIDEMIOLOGY, REVIEW, 6006

- ARSENIC ACID, DISODIUM SALT
  - LYMPHOCYTES
    - AMINO ACIDS, 6547
    - DOSE-RESPONSE STUDY, 6547
    - NUCLEIC ACIDS, 6547
    - TRIPHOSPHATES, 6547
  - NUCLEIC ACIDS
    - THYMIDINE INCORPORATION, 6547

- ARSENIOUS ACID, SODIUM SALT
  - AFLATOXIN B1
    - ACETATE INCORPORATION, 6168*

- ARTHRITIS
  - CYCLOPHOSPHAMIDE
    - CHROMOSOME ABERRATIONS, 6166
  - GOLD
    - CHROMOSOME ABERRATIONS, 6166
  - MANNITOL
    - CHROMOSOME ABERRATIONS, 6166
  - PURINE, 6-((1-METHYL-4-NITROIMIDAZOL-5-YL)THIO)-
    - CHROMOSOME ABERRATIONS, 6166
  - 3,5-PYRAZOLIDINEDIONE, 4-BUTYL-1,2-DIPHENYL-
    - CHROMOSOME ABERRATIONS, 6166
  - P-TOLUAMIDE, N-ISOPROPYL-ALPHA-(2-METHYLHYDRAZINO)-
    - CHROMOSOME ABERRATIONS, 6166

- ARTHRITIS, RHEUMATOID
  - BUTYRIC ACID, 4-(P-(BIS(2-CHLOROETHYL)AMINO)PHENYL)-
    - CARCINOGENIC POTENTIAL, 6167
  - CYCLOHEXIMIDE
    - CARCINOGENIC POTENTIAL, 6167
  - MANNITOL
    - CARCINOGENIC POTENTIAL, 6167
  - NEOPLASMS, MULTIPLE PRIMARY
    - CASE REPORT, 6395
  - PURINE, 6-((1-METHYL-4-NITROIMIDAZOL-5-YL)THIO)-
    - CARCINOGENIC POTENTIAL, 6167
  - P-TOLUAMIDE, N-ISOPROPYL-ALPHA-(2-METHYLHYDRAZINO)-
    - CARCINOGENIC POTENTIAL, 6167

- ARYL HYDROCARBON HYDROXYLASES
  - ANTIPYRINE
    - GENETICS, 6210*
    - HALF-LIFE, 6210*
    - LYMPHOCYTES, 6210*
  - BENZ(A)ANTHRACENE
    - HALF-LIFE, 6198*
  - BENZO(A)PYRENE
    - LYMPHOCYTES, 6202*
    - PHENOL, (1,1-DIMETHYLETHYL)-4-METHOXY-, 6146
  - 7,8-BENZOFLAVONE
    - PHENOL, (1,1-DIMETHYLETHYL)-4-METHOXY-, 6146
  - CYCLOPHOSPHAMIDE
    - HALF-LIFE, 6198*
  - LYMPHOCYTES
    - FLUORESCENCE SPECTROMETRY, 6202*

- ASBESTOS
  - LUNG NEOPLASMS
    - MESOTHELIOMA, 6011
  - AIR POLLUTION
    - CARCINOGENIC POTENTIAL, 6062*
  - ASBESTOSIS
    - FIBERS, 6072*
  - FIBERS
    - CARCINOGENIC EFFECT, 6073*
  - GASTROINTESTINAL NEOPLASMS
    - EPIDEMIOLOGY, REVIEW, 6514
  - LUNG NEOPLASMS
    - AUTOANTIBODIES, 6517
    - CARCINOMA, BRONCHOGENIC, 6517
    - CLINICOPATHOLOGIC STUDY, REVIEW, 6050*
    - EPIDEMIOLOGY, 6517
    - EPIDEMIOLOGY, REVIEW, 6050*, 6514
    - MESOTHELIOMA, 6517
  - MESOTHELIOMA
    - CASE REPORT, 6466*
    - ENVIRONMENTAL HAZARD, 6011
    - EPIDEMIOLOGY, REVIEW, 6050*
    - FIBERS, 6073*
  - NEOPLASMS
    - FIBERS, 6072*
    - MUTATION, 6116*
  - PERITONEAL NEOPLASMS
    - CASE REPORT, 6466*
  - PULMONARY FIBROSIS
    - EPIDEMIOLOGY, REVIEW, 6050*
  - SMOKING
    - CO-CARCINOGENIC ACTIVITY, REVIEW, 6514

- ASBESTOSIS
  - ASBESTOS
    - FIBERS, 6072*

- ASCOMYCETES
  - METHANESULFONIC ACID, ETHYL ESTER
    - MUTAGENIC ACTIVITY, 6217*
  - METHANESULFONIC ACID, METHYL ESTER
    - MUTAGENIC ACTIVITY, 6217*
  - 1,2-OXATHIANE 2,2-DIOXIDE
    - MUTAGENIC ACTIVITY, 6217*
  - 1,2-OXATHIOLANE, 2,2-DIOXIDE
    - MUTAGENIC ACTIVITY, 6217*

- ASCORBIC ACID
  - FOOD CONTAMINATION
    - REVIEW, 6056*

- ASPERGILLUS FLAVUS

- AFLATOXIN B1
  - ACETATE INCORPORATION, 6168*

- ATAXIA TELANGIECTASIA
  - CELL TRANSFORMATION, NEOPLASTIC
    - CHROMOSOME ABNORMALITIES, REVIEW, 6121*
  - GASTROINTESTINAL NEOPLASMS
    - CHROMOSOME ABNORMALITIES, REVIEW, 6121*
  - HODGKIN'S DISEASE
    - CHROMOSOME ABNORMALITIES, REVIEW, 6121*
  - LEUKEMIA
    - CHROMOSOME ABNORMALITIES, REVIEW, 6121*
  - LYMPHOSARCOMA
    - CHROMOSOME ABNORMALITIES, REVIEW, 6121*

- ATEBRINE
  - CHROMATIDS
    - EXCHANGE POINTS, 6212*
  - CHROMOSOME ABERRATIONS
    - G-BANDING, 6212*
  - LYMPHOCYTES
    - CHROMOSOME ABERRATIONS, 6212*

- ATOMIC ENERGY
  - CELL TRANSFORMATION, NEOPLASTIC
    - DOSE-RESPONSE STUDY, REVIEW, 6521
  - LEUKEMIA
    - DOSE-RESPONSE STUDY, REVIEW, 6521

- AUTOANTIBODIES
  - ANEMIA, HEMOLYTIC, AUTOIMMUNE
    - VIRUS, FRIEND MURINE LEUKEMIA, 6330*
  - LUNG NEOPLASMS
    - ASBESTOS, 6517
    - CARCINOMA, BRONCHOGENIC, 6517
    - MESOTHELIOMA, 6517

- AUTOIMMUNE DISEASES
  - IMMUNOSUPPRESSIVE AGENTS
    - IMMUNE RESPONSE, REVIEW, 6090*

- BACILLUS SUBTILIS
  - CARCINOGEN, CHEMICAL
    - SCREENING METHOD, 6184*
  - FLUORESCEIN, 2',4',5',7'-TETRABROMO-, DISODIUM SALT
    - SCREENING METHOD, 6184*

- BACTERIA
  - 1-CYCLOHEXENE-1-CARBOXYLIC ACID, 3,4,5-TRIHYDROXY-
    - METABOLISM, RAT, 6162
  - STOMACH NEOPLASMS
    - NITROSAMINE PRODUCTION, 6106*

- BACTERIOLYSIS
  - HODGKIN'S DISEASE
    - LEUKOCYTES, 6365
    - MACROPHAGES, 6365
    - MONOCYTES, 6365

- BARBITURIC ACID, 5-ETHYL-5-PHENYL-
  - AFLATOXIN B1
    - BINDING, LIVER, 6172*
    - RNA POLYMERASE, 6172*
    - RNA REPLICATION, 6172*
  - DIMETHYLAMINE, N-NITROSO-
    - MUTAGENIC ACTIVITY, 6182*
    - OXIDOREDUCTASES, 6182*

- BCG VACCINATION
  - MELANOMA
    - LYMPHOKINES, 6370
  - NEOPLASMS, EXPERIMENTAL
    - TRANSPLANTATION IMMUNOLOGY, 6378
  - VIRUS, SV40
    - IMMUNE RESPONSE, 6378

- BENZ(A)ANTHRACENE
  - ARYL HYDROCARBON HYDROXYLASES
    - HALF-LIFE, 6198*
  - CELL TRANSFORMATION, NEOPLASTIC
    - K-REGION EPOXIDES, REVIEW, 6033*
  - DNA
    - CARCINOGENIC METABOLITE, 6203*
    - DIOL-EPOXIDES, 6203*
    - K-REGION EPOXIDES, 6203*
  - GLUTATHIONE
    - CARCINOGENIC METABOLITE, 6203*
  - MONOCYTES
    - HALF-LIFE, 6198*
  - OXYGENASES
    - MUTAGENIC ACTIVITY, 6204*
  - PYRIDINE
    - CATIONS, RADICAL, 6200*
  - SALMONELLA TYPHIMURIUM
    - CARCINOGENIC METABOLITE, 6197*
    - MICROSOMES, LIVER, 6197*
    - MUTAGENIC ACTIVITY, 6204*

- BENZ(A)ANTHRACENE, 7-BROMOMETHYL-
  - CAFFEINE
    - DNA REPAIR, 6222*

- BENZ(A)ANTHRACENE, 7,12-DIMETHYL-
  - AIR POLLUTION
    - CARCINOGENIC POTENTIAL, 6060*
  - ANGIOSARCOMA
    - CARCINOMA, 6060*
    - SARCOMA, 6060*
  - CELL TRANSFORMATION, NEOPLASTIC
    - DIOL EPOXIDES, REVIEW, 6033*
  - FIBROBLASTS
    - CELL TRANSFORMATION, NEOPLASTIC, REVIEW, 6036*
    - SURFACE PROPERTIES, REVIEW, 6036*
  - PYRIDINE
    - CATIONS, RADICAL, 6200*
  - SALMONELLA TYPHIMURIUM
    - CARCINOGENIC METABOLITE, 6197*
    - MICROSOMES, LIVER, 6197*

- BENZ(A)ANTHRACENE, 3,4-DIOL
  - OXYGENASES
    - MUTAGENIC ACTIVITY, 6204*
  - SALMONELLA TYPHIMURIUM
    - MUTAGENIC ACTIVITY, 6204*

- BENZ(A)ANTHRACENE, 8,9-DIOL
  - OXYGENASES
    - MUTAGENIC ACTIVITY, 6204*
  - SALMONELLA TYPHIMURIUM

        MUTAGENIC ACTIVITY, 6204*

BENZ(A)ANTHRACENE-5,6-DIONE, 7,12-DIMETHYL-
    P-DIOXANE
        DIHYDRODIOL FORMATION, 6205*
    HYDROCHLORIC ACID
        DIHYDRODIOL FORMATION, 6205*

BENZ(A)ANTHRACENE, 5,6-EPOXY-5,6-DIHYDRO-
    P-DIOXANE
        DIHYDRODIOL FORMATION, 6205*

BENZ(A)ANTHRACENE, 2-METHYL-
    PYRIDINE
        CATIONS, RADICAL, 6200*

BENZ(A)ANTHRACENE, 5-METHYL-
    PYRIDINE
        CATIONS, RADICAL, 6200*

BENZ(A)ANTHRACENE, 6-METHYL-
    PYRIDINE
        CATIONS, RADICAL, 6200*

BENZ(A)ANTHRACENE, 7-METHYL-
    CARCINOGENIC METABOLITE
        DNA, 6203*
    CELL TRANSFORMATION, NEOPLASTIC
        DIOL EPOXIDES, REVIEW, 6033*
    PYRIDINE
        CATIONS, RADICAL, 6200*

BENZ(A)ANTHRACENE, 8-METHYL-
    PYRIDINE
        CATIONS, RADICAL, 6200*

BENZ(A)ANTHRACENE, 11-METHYL-
    PYRIDINE
        CATIONS, RADICAL, 6200*

BENZ(A)ANTHRACENE, 12-METHYL-
    PYRIDINE
        CATIONS, RADICAL, 6200*

BENZ(E)ACEPHENANTHRYLENE
    AIR POLLUTION
        CARCINOGENIC POTENTIAL, 6060*
    ANGIOSARCOMA
        CARCINOMA, 6060*
        SARCOMA, 6060*
    ENDOCRINE GLANDS
        TISSUE DISTRIBUTION, 6194*
    EXOCRINE GLANDS
        TISSUE DISTRIBUTION, 6194*

BENZENAMINE, N,N-DIMETHYL-4-((3-
  METHYLPHENYL)AZO)-
    HEPATOMA
        DNA REPLICATION, 6577*
        ZINC, 6577*

BENZENE
    RADIATION, IONIZING
        CHROMOSOME ABERRATIONS, 6252*
    WATER POLLUTANTS
        DISTRIBUTION, REVIEW, 6064*

BENZENE, 4-ALLYL-1,2-(METHYLENEDIOXY)-
    CARCINOGENIC METABOLITE
        REVIEW, 6040*
    CELL TRANSFORMATION, NEOPLASTIC
        REVIEW, 6041*
    GASTROINTESTINAL NEOPLASMS
        FOOD CONTAMINATION, 6058*

BENZENE, (EPOXYETHYL)-
    LIVER
        METABOLISM, 6196*

BENZENE, HEXACHLORO-
    WATER POLLUTANTS
        DISTRIBUTION, REVIEW, 6064*

BENZENESULFONIC ACID, 2,4,6-TRINITRO-
    ANTIGENS, HETEROGENETIC
        ANTIBODY FORMATION, 6345
        IMMUNITY, CELLULAR, 6345
        T-LYMPHOCYTES, 6345

BENZO(A)PYRENE
    AGE FACTORS
        TISSUE DISTRIBUTION, 6194*
    AIR POLLUTION
        CARCINOGENIC POTENTIAL, 6060*,
          6062*
    ANGIOSARCOMA
        CARCINOMA, 6060*
        SARCOMA, 6060*
    CARBON
        PULMONARY CLEARANCE, MOUSE, 6195*
    CARCINOGENIC METABOLITE
        DNA, 6203*
    CELL TRANSFORMATION, NEOPLASTIC
        DIOL EPOXIDES, REVIEW, 6033*
        REVIEW, 6041*
    CHOLANTHRENE, 3-METHYL-
        METABOLISM, 6199*
    CHROMOSOMES
        CELL TRANSFORMATION, NEOPLASTIC,
          REVIEW, 6120*
    DIMETHYLAMINE, N-NITROSO-
        MUTAGENIC ACTIVITY, 6182*
    ENDOCRINE GLANDS
        TISSUE DISTRIBUTION, 6194*
    ENVIRONMENTAL HAZARD
        VOLCANOS, 6537*
    EXOCRINE GLANDS
        TISSUE DISTRIBUTION, 6194*
    FIBROBLASTS
        BINDING, L CELLS, 6148
        CELL TRANSFORMATION, NEOPLASTIC,
          REVIEW, 6036*
        SURFACE PROPERTIES, REVIEW, 6036*
    HYDRO-LYASES
        CARCINOGENIC METABOLITE, 6145
        DIOL EPOXIDES, 6145
    L CELLS
        METABOLISM, 6148
    LIVER
        HYDRO-LYASES, 6199*
        METABOLISM, 6196*
        OXIDOREDUCTASES, 6199*
        TRANSFERASES, 6199*
    LUNG
        TISSUE DISTRIBUTION, 6194*
    LYMPHOCYTES
        ARYL HYDROCARBON HYDROXYLASES,

- 6202*
        - HYDRO-LYASES, 6199*
        - OXIDOREDUCTASES, 6199*
        - TRANSFERASES, 6199*
    - OXIDOREDUCTASES
        - CARCINOGENIC METABOLITE, 6145
        - DIOL EPOXIDES, 6145
    - PARTICLE SIZE
        - PULMONARY CLEARANCE, MOUSE, 6195*
    - PHENOL, (1,1-DIMETHYLETHYL)-4-METHOXY-
        - ARYL HYDROCARBON HYDROXYLASES, 6146
        - CYTOCHROME P-450, 6146
        - METABOLISM, 6146
        - MICROSOMES, LIVER, 6146
    - PLACENTA
        - METABOLSIM, 6196*
    - SALMONELLA TYPHIMURIUM
        - CARCINOGENIC METABOLITE, 6197*
        - MICROSOMES, LIVER, 6197*
    - SKIN NEOPLASMS
        - OCCUPATIONAL HAZARD, REVIEW, 6004
    - SMOKING
        - METABOLSIM, 6196*
    - TETRAHYMENA PYRIFORMIS
        - PHOTOTOXIC EFFECTS, 6147

- 7,8-BENZOFLAVONE
    - PHENOL, (1,1-DIMETHYLETHYL)-4-METHOXY-
        - ARYL HYDROCARBON HYDROXYLASES, 6146

- BENZOIC ACID, P-NITRO-
    - AFLATOXIN B1
        - ACETATE INCORPORATION, 6168*

- BENZOPYRENE HYDROXYLASE
    - SEE ALSO HYDROXYLASES/ARYL HYDROCARBON HYDROXYLASE

- BENZOXAZOLE, 2-AMINO-5-CHLORO-
    - LIVER
        - METABOLISM, 6196*

- BETAMETHASONE
    - CARCINOMA 256, WALKER
        - GLUCOSEPHOSPHATASE, 6571
        - HEXOSEDIPHOSPHATASE, 6571

- BILE ACIDS AND SALTS
    - COLONIC NEOPLASMS
        - EPIDEMIOLOGY, REVIEW, 6105*
    - HEPATOMA
        - SERUM LEVELS, 6575

- BILE PIGMENTS
    - LIVER DISEASES
        - ANIMAL MODEL, REVIEW, 6046*

- 4-BIPHENYLAMINE
    - NEOPLASMS
        - OCCUPATIONAL HAZARD, 6051*

- BLADDER NEOPLASMS
    - CYSTITIS
        - CASE REPORT, 6450*
    - METAPLASIA
        - CASE REPORT, 6450*
    - 2-NAPHTHYLAMINE
        - HAMSTER, 6190*
    - NEOPLASM TRANSPLANTATION
        - IMMUNE RESPONSE, NEWBORN AND ADUL MOUSE, 6377
    - OCCUPATIONAL HAZARD
        - EPIDEMIOLOGY, REVIEW, 6003
    - POLYPS
        - CYSTISIS, 6450*
    - PRECANCEROUS CONDITIONS
        - CELL DIFFERENTIATION, REVIEW, 6123*
    - SMOKING
        - COCARCINOGENIC ACTIVITY, REVIEW, 6003
    - TRANSPLANTATION IMMUNOLOGY
        - NEOPLASM TRANSPLANTATION, 6377

- BLASTOCYST
    - HELA CELLS
        - CELL TRANSFORMATION, NEOPLASTIC, 6539
        - TRANSPLANTATION, HETEROLOGOUS, 6539
    - TERATOID TUMOR
        - CELL DIFFERENTIATION, 6490*

- BLEOMYCIN
    - ESOPHAGEAL NEOPLASMS
        - ANILINE, N-METHYL-N-NITROSO-, 6215*

- BLOOD-BRAIN BARRIER
    - LEUKEMIA
        - NEOPLASM METASTASIS, REVIEW, 6127

- BLOOD GROUPS
    - ADENOCARCINOMA
        - EPIDEMIOLOGY, 6510
    - BRAIN NEOPLASMS
        - ISOANTIGENS, 6344
    - CARCINOMA
        - EPIDEMIOLOGY, 6510
    - CARCINOMA, EPIDERMOID
        - EPIDEMIOLOGY, 6510
    - ERYTHROLEUKEMIA
        - CASE REPORT, 6413
        - PLANT AGGLUTININS, 6413
    - ISOANTIGENS
        - ISOLATION AND CHARACTERIZATION, BRAIN TISSUE, 6344
    - LEUKEMIA, MYELOBLASTIC
        - CASE REPORT, 6412
        - PLANT AGGLUTININS, 6412
    - PANCREATIC NEOPLASMS
        - EPIDEMIOLOGY, 6510
    - STOMACH NEOPLASMS
        - EPIDEMIOLOGY, 6510
    - UTERINE NEOPLASMS
        - EPIDEMIOLOGY, 6510
        - ISOANTIGENS, 6344
    - XERODERMA PIGMENTOSUM
        - DNA REPAIR, 6118*
        - EPIDEMIOLOGY, 6118*

- BLOOD PLATELETS
    - LEUKEMIA, MYELOCYTIC
        - ULTRASTRUCTURAL STUDY, 6457*

- BLOOD PROTEINS

- MACROGLOBULINEMIA
  - POLYACRYLAMIDE GEL ELECTROPHORESIS, 6351
- MULTIPLE MYELOMA
  - POLYACRYLAMIDE GEL ELECTROPHORESIS, 6351
- NEOPLASMS
  - STATISTICAL ANALYSIS, 6425

BLOOD VESSELS
- BREAST NEOPLASMS
  - HISTOLOGICAL STUDY, 6398
  - NEOPLASM METASTASIS, 6398

BONE MARROW
- ERYTHROLEUKEMIA
  - POLYPLOIDY, 6449*
- LEUKEMIA, MYELOBLASTIC
  - POLYPLOIDY, 6449*
- LEUKEMIA, MYELOCYTIC
  - POLYPLOIDY, 6449*

BONE MARROW CELLS
- ANTIVIRAL AGENTS
  - MUTAGENIC ACTIVITY, 6221*
- ERYTHROLEUKEMIA
  - CHROMOSOME ABNORMALITIES, 6453*
- LEUKEMIA, MYELOBLASTIC
  - ERYTHROPOIESIS, 6483*
- LEUKEMIA, MYELOCYTIC
  - CELL DIVISION, 6542
  - DNA REPLICATION, 6542
  - ULTRASTRUCTURAL STUDY, 6457*
- MULTIPLE MYELOMA
  - ANTIGEN-ANTIBODY REACTIONS, 6381*
- RETICULOENDOTHELIOSIS
  - IGM, 6353
  - IMMUNOGLOBULINS, 6353
- UREA, 1-BUTYL-1-NITROSO-
  - CHROMOSOMES, 6219*
- UREA, N-METHYL-N-(4-PHENYLTHIAZOLYL)-
  - MUTAGENIC ACTIVITY, 6221*
- VIRUS, FRIEND MURINE LEUKEMIA
  - IMMUNE RESPONSE, 6328*
  - STRONTIUM RADIOISOTOPES, 6328*
- VIRUS, JM-V HERPES
  - CHROMOSOME ABERRATIONS, 6324*

BONE NEOPLASMS
- ANTIGENS, NEOPLASM
  - NEOPLASM METASTASIS, 6373
- CALCIUM
  - METABOLISM, REVIEW, 6103*
- CHOLANTHRENE, 3-METHYL-
  - TRANSPLANTATION IMMUNOLOGY, 6373
- CHONDROSARCOMA
  - BIOCHEMICAL STUDY, REVIEW, 6103*
- EOSINOPHILIC GRANULOMA
  - CASE REPORT, MULTIFOCAL DISEASE, 6446*
  - DIAGNOSIS AND TREATMENT, 6446*
- MULTIPLE MYELOMA
  - BIOCHEMICAL STUDY, REVIEW, 6103*
- NEOPLASM METASTASIS
  - CASE REPORT, 6473*
  - EPIDEMIOLOGY, REVIEW, 6103*
  - GRAFT REJECTION, 6373
- PHOSPHORUS
  - METABOLISM, REVIEW, 6103*
- RADIUM
  - EPIDEMIOLOGY, 6245*
- SARCOMA, OSTEOGENIC
  - BIOCHEMICAL STUDY, REVIEW, 6103*
  - IMMUNITY, CELLULAR, 6367

BRAIN DISEASES
- CELLULAR INCLUSIONS
  - ULTRASTRUCTURAL STUDY, 6443*
- PANCREAS
  - ULTRASTRUCTURAL STUDY, 6443*

BRAIN NEOPLASMS
- DERMOID CYST
  - CASE REPORT, 6459*
- GLIOMA
  - UREA, ETHYL NITROSO-, 6157
- ISOANTIGENS
  - BLOOD GROUPS, 6344
- SARCOMA, RETICULUM CELL
  - VIRUS, PAPOVA, 6337*
- UREA, ETHYL NITROSO-
  - ACID PHOSPHATASE, 6157

BREAST NEOPLASMS
- BLOOD VESSELS
  - HISTOLOGICAL STUDY, 6398
- CELL DIVISION
  - CELL CYCLE KINETICS, 6497
- CONTRACEPTIVES, ORAL
  - CARCINOGENIC POTENTIAL, REVIEW, 6007, 6009
- DIET
  - IODINE, 6535*
- DIETARY FATS
  - EPIDEMIOLOGY, REVIEW, 6057*
- EMOTIONS
  - EPIDEMIOLOGY, 6499
  - PERSONALITY ASSESSMENT, 6499
  - PRECANCEROUS CONDITIONS, 6499
- EPIDEMIOLOGY, INDIA
  - REVIEW, 6498
- ESTROGENS, SYNTHETIC
  - CARCINOGENIC POTENTIAL, REVIEW, 6009
- ETHYL ALCOHOL
  - EPIDEMIOLOGY, MORMONS, 6503
- FIBROMA
  - GENETICS, 6422
- GASTROINTESTINAL NEOPLASMS
  - EPIDEMIOLOGY, CORRELATION STUDY, 6532*
- GROWTH
  - CELL CYCLE KINETICS, 6497
- HISTOCOMPATIBILITY ANTIGENS
  - REVIEW, 6093*
- IMMUNOLOGIC TECHNICS
  - REVIEW, 6088*
- INCIDENCE RATES
  - EPIDEMIOLOGY, INDIA, 6511
- IODINE
  - EPIDEMIOLOGY, 6535*
- LYMPHATIC METASTASIS
  - NUCLEI, PLEOMORPHISM, 6427
- LYMPHOCYTES
  - IMMUNITY, CELLULAR, 6386*
- MELANOMA
  - LEUKOCYTE CULTURE TEST, MIXED, 6386*

    - NEOPLASMS, MULTIPLE PRIMARY, 6406
  - MENINGES
    - NEOPLASM METASTASIS, 6460*
  - NEOPLASM METASTASIS
    - BLOOD VESSELS, 6398
    - REVIEW, 6497
  - NEOPLASM RECURRENCE, LOCAL
    - PRECANCEROUS CONDITIONS, 6496
  - NEOPLASM REGRESSION, SPONTANEOUS
    - IMMUNE RESPONSE, REVIEW, 6027
  - PRECANCEROUS CONDITIONS
    - CLASSIFICATION, 6496
  - PROLACTIN
    - EPIDEMIOLOGY, REVIEW, 6057*
  - RADIATION, IONIZING
    - PRECANCEROUS CONDITIONS, 6076*
  - RESPIRATORY TRACT NEOPLASMS
    - EPIDEMIOLOGY, CORRELATION STUDY, 6532*
  - RIBONUCLEASE
    - SERUM LEVELS, 6556
  - RNA
    - CYTOTOXICITY TESTS, IMMUNOLOGIC, 6343
    - IMMUNE RESPONSE, HETEROLOGOUS LYMPHOCYTES, 6343
  - TRANSPLANTATION, HETEROLOGOUS
    - ULTRASTRUCTURAL STUDY, 6375
  - UROGENITAL NEOPLASMS
    - EPIDEMIOLOGY, CORRELATION STUDY, 6532*

- BRONCHIAL NEOPLASMS
  - CARCINOMA
    - RETINOL, 6394
  - CARCINOMA, EPIDERMOID
    - RETINOL, 6394
  - CARCINOMA, OAT CELL
    - RETINOL, 6394

- BRONCHITIS
  - CARCINOEMBRYONIC ANTIGEN
    - SERUM LEVELS, 6520

- BURKITT'S LYMPHOMA
  - ANTIGENS, VIRAL
    - EPIDEMIOLOGY, REVIEW, 6082*
  - CELLS, CULTURED
    - LYMPHOCYTE TRANSFORMATION, 6361
  - MULTIPLE MYELOMA
    - ANTIGENIC DETERMINANTS, 6381*
  - VIRUS, EPSTEIN-BARR
    - ANTIBODIES, VIRAL, 6340*
    - ANTIGEN-ANTIBODY REACTIONS, 6340*
    - ANTIGENS, VIRAL, 6341*
    - CASE REPORT, 6341*
    - DNA-DNA HYBRIDIZATION, REVIEW, 6018
    - DNA, VIRAL, 6341*
    - EPIDEMIOLOGY, REVIEW, 6082*

- 2,3-BUTANEDIONE
  - CARCINOEMBRYONIC ANTIGEN
    - ANTIGEN-ANTIBODY REACTIONS, 6348

- BUTYRIC ACID, 4-(P-(BIS(2-CHLOROETHYL) AMINO)PHENYL)-
  - ARTHRITIS, RHEUMATOID
    - CARCINOGENIC POTENTIAL, 6167

- CAFFEINE
  - ACETAMIDE, N-(ACETYLOXY)-N-9H-FLUOREN-2-YL-
    - DNA REPAIR, 6222*
  - ANEMIA, APLASTIC
    - CHROMOSOME ABERRATIONS, 6434*
  - BENZ(A)ANTHRACENE, 7-BROMOMETHYL-
    - DNA REPAIR, 6222*
  - DNA REPAIR
    - CELL TRANSFORMATION, NEOPLASTIC, REVIEW, 6010
  - PLATINUM, DIAMINEDICHLORO-
    - DNA REPAIR, 6222*
  - RADIATION, IONIZING
    - DNA REPAIR, 6256*
    - DOSE-RESPONSE STUDY, HAMSTER, 6256*
  - ULTRAVIOLET RAYS
    - DNA REPAIR, 6256*
    - DOSE-RESPONSE STUDY, HAMSTER, 6256*
  - UREA, METHYL NITROSO-
    - DNA REPAIR, 6222*
  - XERODERMA PIGMENTOSUM
    - DNA REPAIR, 6247*
    - ULTRAVIOLET RAYS, 6247*

- CALCITONIN
  - THYROID NEOPLASMS
    - CARCINOMA, 6538
    - RADIOIMMUNOASSAY, 6538

- CALCIUM
  - BONE NEOPLASMS
    - METABOLISM, REVIEW, 6103*

- CANCER
  - SEE NEOPLASMS (GENERAL AND UNSPECIFIED

- CARBAMIC ACID, DIETHYLDITHIO-, 2-CHLOROALLYL ESTER
  - WATER POLLUTANTS
    - DISTRIBUTION, REVIEW, 6064*

- CARBAMIC ACID, DIISOPROPYLTHIO-, S-(2,3-DICHLOROALLYL) ESTER
  - WATER POLLUTANTS
    - DISTRIBUTION, REVIEW, 6064*

- CARBAMIC ACID, ETHYL ESTER
  - DNA
    - BINDING SITES, LIVER, RAT, 6208*

- CARBAMIC ACID, ETHYLNITROSO-, ETHYL ESTER
  - STOMACH NEOPLASMS
    - DOSE-RESPONSE STUDY, 6218*

- CARBAMIC ACID, METHYL-, 1-NAPHTHYL ESTER
  - STOMACH NEOPLASMS
    - CARCINOMA, EPIDERMOID, 6220*
    - N-NITROSO DERIVATIVE, 6218*, 6220*

- CARBAMIC ACID, N-METHYL-N-NITROSO-, ETHYL ESTER
  - STOMACH NEOPLASMS
    - DOSE-RESPONSE STUDY, 6218*

- CARBON

- BENZO(A)PYRENE
  - PULMONARY CLEARANCE, MOUSE, 6195*
- PARTICLE SIZE
  - PULMONARY CLEARANCE, MOUSE, 6195*

CARBON TETRACHLORIDE
- WATER POLLUTANTS
  - DISTRIBUTION, REVIEW, 6064*

CARCINOEMBRYONIC ANTIGEN
- AMINO ACIDS
  - ANTIGEN-ANTIBODY REACTIONS, 6348
  - CHEMICAL MODIFICATION, 6348
- BRONCHITIS
  - SERUM LEVELS, 6520
- 2,3-BUTANEDIONE
  - ANTIGEN-ANTIBODY REACTIONS, 6348
- IMIDAZOLE, N-ACETYL-
  - ANTIGEN-ANTIBODY REACTIONS, 6348
- METHANE, TETRANITRO-
  - ANTIGEN-ANTIBODY REACTIONS, 6348
- PEROXYFORMIC ACID
  - ANTIGEN-ANTIBODY REACTIONS, 6348
- PHENOL, 4-BROMO-2-NITRO-
  - ANTIGEN-ANTIBODY REACTIONS, 6348
- SMOKING
  - SERUM LEVELS, 6520
- SOCIOECONOMIC FACTORS
  - SERUM LEVELS, 6520
- TRYPTOPHAN
  - CHEMICAL MODIFICATION, 6348
- TYROSINE
  - CHEMICAL MODIFICATION, 6348

CARCINOGEN, CHEMICAL
- ANIMAL MODEL
  - REVIEW, 6008
- CARCINOGENIC METABOLITE
  - SCREENING ASSAYS, REVIEW, 6031*
- CARCINOGENIC POTENTIAL
  - SCREENING TEST, SHORT TERM, 6193*
- CARRIER PROTEINS
  - EPOXIDES, 6201*
  - LIVER, RAT, 6201*
- CELL TRANSFORMATION, NEOPLASTIC
  - REVIEW, 6044*
  - TISSUE CULTURE, REVIEW, 6137*
- CHROMOSOMES
  - MUTAGENIC ACTIVITY, REVIEW, 6070*
- DNA
  - METHYLATION, REVIEW, 6038*
- DNA REPAIR
  - CELL TRANSFORMATION, NEOPLASTIC, REVIEW, 6010
  - MUTAGENIC ACTIVITY, REVIEW, 6039*
- DOSE-RESPONSE
  - MATHEMATICAL MODELS, REVIEW, 6034*
  - THRESHOLD LEVELS, REVIEW, 6034*
- FISHES
  - MONITORING SYSTEMS, REVIEW, 6065*
- GASTROINTESTINAL NEOPLASMS
  - SYNERGISM, REVIEW, 6045*
- MAMMARY NEOPLASMS, EXPERIMENTAL
  - IMMUNE RESPONSE, REVIEW, 6027
- MUTAGENIC ACTIVITY
  - SCREENING ASSAYS, REVIEW, 6031*
- NEOPLASMS, EXPERIMENTAL
  - DIETARY FACTORS, REVIEW, 6059*
- PRECANCEROUS CONDITIONS
  - REVIEW, 6044*
- SKIN NEOPLASMS
  - OCCUPATIONAL HAZARD, REVIEW, 6002
- UROGENITAL NEOPLASMS
  - SYNERGISM, REVIEW, 6045*
- WATER POLLUTION
  - DISTRIBUTION, REVIEW, 6064*

CARCINOGEN, ENVIRONMENTAL
- NEOPLASMS
  - EPIDEMIOLOGY, REVIEW, 6514
  - REVIEW, 6037*
- SKIN NEOPLASMS
  - CARCINOGEN, CHEMICAL, 6065*

CARCINOMA
- ADRENAL GLAND NEOPLASMS
  - STEROIDS, REVIEW, 6102*
- BENZ(A)ANTHRACENE, 7,12-DIMETHYL-
  - ANGIOSARCOMA, 6060*
- BENZ(E)ACEPHENANTHRYLENE
  - ANGIOSARCOMA, 6060*
- BENZO(A)PYRENE
  - ANGIOSARCOMA, 6060*
- BLOOD GROUPS
  - EPIDEMIOLOGY, 6510
- BRONCHIAL NEOPLASMS
  - RETINOL, 6394
- CERVIX NEOPLASMS
  - ULTRASTRUCTURAL STUDY, 6477*
- FACIAL NEOPLASMS
  - WOUNDS AND INJURIES, 6396
- LARYNGEAL NEOPLASMS
  - NAPHTHALENE, 6516
- LARYNGECTOMY
  - REVIEW, 6099*
- LUNG NEOPLASMS
  - IMMUNITY, CELLULAR, 6362
- NEOPLASMS, MULTIPLE PRIMARY
  - PREDNISONE, 6395
  - PURINE, 6-((1-METHYL-4-NITROIMIDAZOL-5-YL)THIO)-, 6395
- NOSE NEOPLASMS
  - ANIMALS, DOMESTIC, 6433
- PARANASAL SINUS NEOPLASMS
  - ANIMALS, DOMESTIC, 6433
- SALIVARY GLAND NEOPLASMS
  - RADIATION, IONIZING, 6274*
- SKIN NEOPLASMS
  - NICOTINE, 6176*
  - ULTRAVIOLET RAYS, 6266*
- THYROID NEOPLASMS
  - CALCITONIN, 6538
  - CASE REPORT, CHILD, 6439*
- TONGUE NEOPLASMS
  - CASE REPORT, 6461*
  - ULTRASTRUCTURAL STUDY, 6461*
- UTERINE NEOPLASMS
  - CASE REPORT, 6108*
  - DIAGNOSIS AND PROGNOSIS, 6526*
  - REVIEW, 6108*

CARCINOMA, BASAL CELL
- GLUCOSEPHOSPHATE DEHYDROGENASE
  - ENZYMATIC ACTIVITY, 6599*
- GLYCERALDEHYDEPHOSPHATE DEHYDROGENASE
  - FLUOROMETRY, 6586*
- HYALIN SUBSTANCE
  - ULTRASTRUCTURAL STUDY, 6400

- IGM
  - SERUM LEVELS, 6354
- ISOMERASES
  - ENZYMATIC ACTIVITY, 6599*
- MOUTH NEOPLASMS
  - CASE REPORT, 6463*
  - PROSTHESIS, 6463*
  - TRANSPLANTATION, HOMOLOGOUS, 6463*
- PHOSPHOGLUCONATE DEHYDROGENASE
  - ENZYMATIC ACTIVITY, 6599*
- PHOSPHOGLYCERATE KINASE
  - FLUOROMETRY, 6586*
- PHOSPHOGLYCEROMUTASE
  - FLUOROMETRY, 6586*
- PHOSPHOPYRUVATE HYDRATASE
  - FLUOROMETRY, 6586*
- PYRUVATE KINASE
  - FLUOROMETRY, 6586*
- TRANSFERASES
  - ENZYMATIC ACTIVITY, 6599*

CARCINOMA, BRONCHOGENIC
- IMMUNOLOGIC TECHNICS
  - REVIEW, 6088*
- LUNG NEOPLASMS
  - ASBESTOS, 6517
  - AUTOANTIBODIES, 6517
- NEOPLASM METASTASIS
  - IGM, 6354

CARCINOMA, EHRLICH TUMOR
- CELL MOVEMENT
  - MICROVILLI ALIGNMENT, 6574
- CHROMOSOMES
  - HETEROCHROMATIN, 6481*
- GLUCOSE
  - GLYCOGEN, 6573
- B-LYMPHOCYTES
  - EMBRYO, MOUSE, 6369
  - LIVER, MOUSE, 6369
  - SPLEEN, MOUSE, 6369
- MACROPHAGES
  - EMBRYO, MOUSE, 6369
  - LIVER, MOUSE, 6369
  - SPLEEN, MOUSE, 6369
- MICROSOMES
  - PHOSPHOLIPIDS, 6598*
- MITOCHONDRIA
  - PHOSPHOLIPIDS, 6598*
- RIBONUCLEASE
  - ISOLATION AND CHARACTERIZATION, REVIEW, 6133*
- TEMPERATURE
  - PHOSPHOLIPIDS, 6598*

CARCINOMA, EMBRYONAL
- SEE TERATOID TUMOR

CARCINOMA, EPIDERMOID
- BLOOD GROUPS
  - EPIDEMIOLOGY, 6510
- BRONCHIAL NEOPLASMS
  - RETINOL, 6394
- CERVIX NEOPLASMS
  - CONNECTIVE TISSUE, HISTOLOGICAL STUDY, 6475*
- CHELATING AGENTS
  - CLOSTRIDIOPEPTIDASE A, 6416
- ESOPHAGEAL NEOPLASMS
  - ANILINE, N-METHYL-N-NITROSO-, 6215*
  - EPIDEMIOLOGY, BLACKS, 6504
- FACIAL NEOPLASMS
  - WOUNDS AND INJURIES, 6396
- GASES, HYPERBARIC
  - RADIOTHERAPY, 6275*
- GLUCOSEPHOSPHATE DEHYDROGENASE
  - ENZYMATIC ACTIVITY, 6599*
- GLYCERALDEHYDEPHOSPHATE DEHYDROGENASE
  - FLUOROMETRY, 6586*
- HYALIN SUBSTANCE
  - ULTRASTRUCTURAL STUDY, 6400
- ISOMERASES
  - ENZYMATIC ACTIVITY, 6599*
- LARYNGEAL NEOPLASMS
  - NAPHTHALENE, 6516
- MOUTH NEOPLASMS
  - EPIDEMIOLOGY, SRI LANKA, 6513
  - OCCUPATIONAL HAZARD, 6530*
  - PRECANCEROUS CONDITIONS, 6124*
- NOSE NEOPLASMS
  - OCCUPATIONAL HAZARD, REVIEW, 6001
- OXYGEN
  - RADIOTHERAPY, 6275*
- PENILE NEOPLASMS
  - EPIDEMIOLOGY, INDIA, 6494
- PHARYNGEAL NEOPLASMS
  - OCCUPATIONAL HAZARD, 6530*
- PHOSPHOGLUCONATE DEHYDROGENASE
  - ENZYMATIC ACTIVITY, 6599*
- PHOSPHOGLYCERATE KINASE
  - FLUOROMETRY, 6586*
- PHOSPHOGLYCEROMUTASE
  - FLUOROMETRY, 6586*
- PHOSPHOPYRUVATE HYDRATASE
  - FLUOROMETRY, 6586*
- PIPERAZINES
  - CLOSTRIDIOPEPTIDASE A, 6416
- PYRUVATE KINASE
  - FLUOROMETRY, 6586*
- SKIN NEOPLASMS
  - HISTOLOGICAL STUDY, 6402
- STOMACH NEOPLASMS
  - CARBAMIC ACID, METHYL-, 1-NAPHTHYL ESTER, 6220*
- TRANSFERASES
  - ENZYMATIC ACTIVITY, 6599*
- TRANSPLANTATION, HETEROLOGOUS
  - MOUSE, NUDE, 6376
- ULTRAVIOLET RAYS
  - ANTILYMPHOCYTE SERUM, 6264*
  - PURINE-6-THIOL, 6264*

CARCINOMA IN SITU
- CERVIX NEOPLASMS
  - EPIDEMIOLOGY, 6109*
  - EPIDEMIOLOGY, REVIEW, 6085*
  - ULTRASTRUCTURAL STUDY, 6477*
- CHROMOSOME ABNORMALITIES
  - REVIEW, 6119*

CARCINOMA, MUCINOUS
- STOMACH NEOPLASMS
  - GUANIDINE, 1-METHYL-3-NITRO-1-NITROSO-, 6156

CARCINOMA, OAT CELL
- BRONCHIAL NEOPLASMS

    - RETINOL, 6394

- CARCINOMA, PAPILLARY
  - THYROID NEOPLASMS
    - EPIDEMIOLOGY, POLAND, 6502
    - THYROTROPIN, 6565

- CARCINOMA, RENAL CELL
  - SEE ADENOCARCINOMA

- CARCINOMA, SCIRRHOUS
  - GASTROINTESTINAL NEOPLASMS
    - NAPHTHALENE, 6516
  - TRANSPLANTATION, HETEROLOGOUS
    - CELL DIFFERENTIATION, 6375

- CARCINOMA, SQUAMOUS CELL
  - SEE CARCINOMA, EPIDERMOID

- CARCINOMA 256, WALKER
  - BETAMETHASONE
    - GLUCOSEPHOSPHATASE, 6571
    - HEXOSEDIPHOSPHATASE, 6571
  - GLUCAGON
    - GLYCOGENESIS, 6571
  - GLUCONEOGENESIS
    - ENZYMATIC ACTIVITY, 6572
  - GLUCOSE
    - SERUM LEVELS, 6571
  - LIVER
    - AMINOTRANSFERASES, 6572
    - ENZYMES, 6572
    - GLUCONEOGENESIS, 6572
    - GLYCOGEN, 6572
    - HEXOSEDIPHOSPHATASE, 6572

- CARDIOLIPINS
  - HEPATOMA
    - MITOCHONDRIA, 6581*

- CARDIOVASCULAR DISEASES
  - EPIDEMIOLOGY
    - MASONS, 6515

- CARRIER PROTEINS
  - CARCINOGEN, CHEMICAL
    - EPOXIDES, 6201*
    - LIVER, RAT, 6201*
  - DNA
    - SUBCELLULAR FRACTIONS, FIBROBLASTS, 6550
  - FIBROBLASTS
    - DNA, 6550

- CARTILAGE
  - HELA CELLS
    - MOUSE, NUDE, 6428

- CATHEPSIN
  - MELANOMA
    - 2,6-PIPERAZINEDIONE, 4,4'-PROPYLENEDI-, 6416

- CELL ADHESION
  - CLOSTRIDIOPEPTIDASE A
    - FIBROBLASTS, 6592*
  - LUNG NEOPLASMS
    - NEOPLASM METASTASIS, REVIEW, 6431
  - TRYPSIN
    - FIBROBLASTS, 6592*

- CELL DIFFERENTIATION
  - AGAMMAGLOBULINEMIA
    - B-LYMPHOCYTES, 6350
  - CARCINOMA, SCIRRHOUS
    - TRANSPLANTATION, HETEROLOGOUS, 6375
  - CELLS, CULTURED
    - CELL MEMBRANE, 6135*
    - CELL TRANSFORMATION, NEOPLASTIC, 6135*
  - CORTICOTROPIN
    - ADRENAL CORTEX HORMONES, 6566
    - PREGNENOLONE, 6566
  - EYE NEOPLASMS
    - MELANOMA, 6405
    - NEOPLASMS, EMBRYONAL AND MIXED, 6405
  - HELA CELLS
    - MOUSE, NUDE, 6428
  - HEPATOMA
    - NEOPLASM TRANSPLANTATION, 6372
  - LEUKEMIA, LYMPHOCYTIC
    - ADENYL CYCLASE, 6596*
    - FLUORESCENCE PROBE, 6596*
    - RNA, RIBOSOMAL, 6596*
  - LEUKEMIA, MYELOBLASTIC
    - CASE REPORT, REMISSION, 6410
    - CELL TRANSFORMATION, NEOPLASTIC, 6483*
    - NEUTROPHILS, 6563
  - LEUKEMIA, MYELOCYTIC
    - ACID PHOSPHATASE, 6409
    - AMINOPEPTIDASES, 6409
    - CHROMOSOMES, HUMAN, 21-22, 6409
    - DIAGNOSIS AND TREATMENT, REVIEW, 6128*
    - ESTERASES, 6409
    - GLUCURONIDASE, 6409
    - NEOPLASM TRANSPLANTATION, 6484*
  - B-LYMPHOCYTES
    - DEXTRAN SULFATE, 6368
    - LIPOPOLYSACCHARIDES, 6368
    - TUBERCULIN, 6368
  - NEUROBLASTOMA
    - ANTIGENS, 6347
  - TERATOID TUMOR
    - BLASTOCYST, 6490*
    - CLONE CELLS, 6485*
    - EMBRYO, 6487*, 6490*
    - HISTOLOGICAL STUDY, 6489*
    - KIDNEY, 6487*
    - MOSAICISM, 6490*
    - NEOPLASM TRANSPLANTATION, 6489*
    - PLOIDY, 6487*
    - RAT, 6130*
    - TESTICULAR NEOPLASMS, 6487*
    - TRANSPLANTATION, 6130*
    - ULTRASTRUCTURAL STUDY, 6485*
    - VIRUS REPLICATION, 6488*
  - THYMUS NEOPLASMS
    - LYMPHOCYTES, 6030
  - VIRUS, RAUSCHER MURINE LEUKEMIA

        - CELLS, CULTURED, 6288
        - SPLEEN, 6288
        - THYMUS GLAND, 6288
        - VIRUS, POLYOMA, 6288
        - VIRUS REPLICATION, 6288

- CELL DIVISION
    - BREAST NEOPLASMS
        - CELL CYCLE KINETICS, 6497
    - FIBROBLASTS
        - CELLS, CULTURED, 6543
    - LEUKEMIA, MYELOCYTIC
        - BONE MARROW CELLS, 6542
    - PEPTIDE HYDROLASES
        - FIBROBLASTS, 6593*
    - PLANT TUMORS
        - PURINES, 6522
    - PRONASE
        - FIBROBLASTS, 6593*
    - PROTEIN KINASE
        - OVARY, HAMSTER, 6558
    - TRYPSIN
        - FIBROBLASTS, 6593*

- CELL FUSION
    - HELA CELLS
        - FIBROBLASTS, 6426
    - VIRUS, SV40
        - CELL TRANSFORMATION, NEOPLASTIC, 6338*

- CELL MEMBRANE
    - ADENOSINE CYCLIC 3',5' MONOPHOSPHATE
        - CELL TRANSFORMATION, NEOPLASTIC, REVIEW, 6136*
    - AGGLUTINATION
        - CELL TRANSFORMATION, NEOPLASTIC, REVIEW, 6136*
    - CELLS, CULTURED
        - CELL DIFFERENTIATION, 6135*
        - CELL TRANSFORMATION, NEOPLASTIC, 6135*
        - DNA REPLICATION, 6135*
    - CLOSTRIDIOPEPTIDASE A
        - PROTEINS, 6592*
    - EPITHELIAL CELLS
        - ADENOSINE TRIPHOSPHATASE, 6588*
        - ULTRASTRUCTURAL STUDY, 6588*
    - GLYCOLIPIDS
        - CELL TRANSFORMATION, NEOPLASTIC, REVIEW, 6136*
    - GLYCOPROTEINS
        - CELL TRANSFORMATION, NEOPLASTIC, 6279
        - CELL TRANSFORMATION, NEOPLASTIC, REVIEW, 6136*
    - HEPATOMA
        - DEXAMETHASONE, 6594*
    - LEUKEMIA
        - VISCOSITY, REVIEW, 6595*
    - LEUKEMIA, LYMPHOBLASTIC
        - T-LYMPHOCYTES, 6125*
    - LEUKEMIA, LYMPHOCYTIC
        - ANTIGENS, 6385*
    - NEOPLASMS
        - ANTIGENIC DETERMINANTS, REVIEW, 6026
        - ANTIGENS, NEOPLASMS, REVIEW, 6026
        - ANTIGENS, VIRAL, REVIEW, 6026
        - HISTOCOMPATIBILITY ANTIGENS, 6025
        - HISTOCOMPATIBILITY ANTIGENS, REVIEW, 6026
    - NEUROBLASTOMA
        - ANTIGENS, 6347
    - PEPTIDE HYDROLASES
        - CELL TRANSFORMATION, NEOPLASTIC, REVIEW, 6136*
    - PEROXIDASES
        - IODOPROTEINS, 6134*
    - SARCOMA
        - FORSSMAN ANTIGEN, 6570
        - GANGLIOSIDES, 6570
        - TRANSFERASES, 6570
    - THROMBIN
        - PROTEINS, 6592*
    - TRYPSIN
        - PROTEINS, 6592*
    - VIRAL PROTEINS
        - ISOLATION AND CHARACTERIZATION, 6023
    - VIRUS, DNA TUMOR
        - CELL TRANSFORMATION, NEOPLASTIC, REVIEW, 6087*
    - VIRUS, MURINE LEUKEMIA
        - ANTIGEN-ANTIBODY COMPLEX, 6331*
        - ANTIGENS, 6331*
        - HISTOCOMPATIBILITY ANTIGENS, 6331
    - VIRUS, ROUS SARCOMA
        - PHOSPHOLIPIDS, 6281
    - VIRUS, SV40
        - CELL TRANSFORMATION, NEOPLASTIC, 6589*

- CELL NUCLEUS
    - RADIATION, IONIZING
        - DEOXYRIBONUCLEASE, 6248*
        - DNA, 6248*

- CELL TRANSFORMATION, NEOPLASTIC
    - ACETAMIDE, N-FLUOREN-2-YL-
        - REVIEW, 6041*, 6044*
    - AFLATOXIN B1
        - REVIEW, 6041*
    - AGING
        - HYBRID CELLS, 6426
    - ANEMIA, APLASTIC
        - CHROMOSOME ABNORMALITIES, REVIEW, 6121*
        - EPIDEMIOLOGY, 6434*
        - EPIDEMIOLOGY, REVIEW, 6122*
    - ANTINEOPLASTIC AGENTS
        - FIBROBLASTS, REVIEW, 6033*
    - ATAXIA TELANGIECTASIA
        - CHROMOSOME ABNORMALITIES, REVIEW, 6121*
    - ATOMIC ENERGY
        - DOSE-RESPONSE STUDY, REVIEW, 6521
    - BENZ(A)ANTHRACENE
        - K-REGION EPOXIDES, REVIEW, 6033*
    - BENZ(A)ANTHRACENE, 7,12-DIMETHYL-
        - DIOL EPOXIDES, REVIEW, 6033*
    - BENZ(A)ANTHRACENE, 7-METHYL-
        - DIOL EPOXIDES, REVIEW, 6033*
    - BENZENE, 4-ALLYL-1,2-(METHYLENEDIOXY)

  REVIEW, 6041*
BENZO(A)PYRENE
  DIOL EPOXIDES, REVIEW, 6033*
  REVIEW, 6041*
CARCINOGEN, CHEMICAL
  REVIEW, 6041*, 6044*
  TISSUE CULTURE, REVIEW, 6137*
CARCINOGENIC METABOLITE
  REVIEW, 6041*
CELL MEMBRANE
  GLYCOPROTEINS, 6279
CELLS, CULTURED
  CELL CYCLE KINETICS, 6135*
  CELL DIFFERENTIATION, 6135*
  CELL MEMBRANE, 6135*
  DNA REPLICATION, 6135*
CHOLANTHRENE, 3-METHYL-
  K-REGION EPOXIDES, REVIEW, 6033*
CHROMOSOME ABNORMALITIES
  REVIEW, 6119*
CYTOCHROME OXIDASE
  FREE RADICALS, 6584*
DIBENZ(A,H)ANTHRACENE
  K-REGION EPOXIDES, REVIEW, 6033*
DIETHYLAMINE, N-NITROSO-
  COBALT CHLORIDE, 6160
  COPPER SULFATE, 6160
EPITHELIAL CELLS
  ADENOSINE TRIPHOSPHATASE, 6588*
  ULTRASTRUCTURAL STUDY, 6588*
ETHYLENE, CHLORO- POLYMER
  DOSE-RESPONSE STUDY, REVIEW, 6052*
FIBROBLASTS
  TISSUE CULTURE, REVIEW, 6137*
FRUCTOSEDIPHOSPHATE ALDOLASE
  SERUM LEVELS, REVIEW, 6131*
GLUCOSEPHOSPHATE ISOMERASE
  SERUM LEVELS, REVIEW, 6131*
GUANIDINE, 1-METHYL-3-NITRO-1-NITROSO-
  TRANSFERASES, 6338*
HELA CELLS
  BLASTOCYST, 6539
  HYBRID CELLS, 6426
HISTOCOMPATIBILITY ANTIGENS
  REVIEW, 6093*
IMMUNOLOGIC DEFICIENCY SYNDROMES
  IMMUNOSUPPRESSION, REVIEW, 6091*
LACTATE DEHYDROGENASE
  SERUM LEVELS, REVIEW, 6131*
LASERS
  PHOTONS, ABSORPTION AND REEMISSION, 6269*
LEUKEMIA, MYELOBLASTIC
  CELL DIFFERENTIATION, 6483*
MOLLUSCA
  REVIEW, 6089*
MYELOMA PROTEINS
  IMMUNOGLOBULINS, HEAVY CHAIN, 6024
  IMMUNOGLOBULINS, LIGHT CHAIN, 6024
ONCOGENIC VIRUSES
  REVIEW, 6084*
OUABAIN
  TRANSFERASES, 6338*
OXYGEN
  CYTOCHROME OXIDASE, 6584*
PLASMINOGEN
  RNA REPLICATION, 6590*
POLYCYCLIC HYDROCARBONS
  PHOTONS, ABSORPTION AND REEMISSION, 6269*
QUINOLINE, 4-NITRO-, 1-OXIDE
  CONTACT INHIBITION, 6209*
  UREA, HYDROXY-, 6209*
RADIATION
  DOSE-RESPONSE STUDY, REVIEW, 6075*
RADIATION INJURIES, EXPERIMENTAL
  RADIATION DOSAGE, HAMSTER EMBRYO, IN UTERO, 6271*
RADIATION, IONIZING
  DOSE-RESPONSE STUDY, MOUSE EMBRYO CELLS, 6263*
  RADIATION DOSAGE, HAMSTER EMBRYO, IN UTERO, 6271*
RIBONUCLEASE
  ENZYMATIC ACTIVITY, REVIEW, 6133*
TRANSPLANTATION, HOMOLOGOUS
  IMMUNOSUPPRESSION, REVIEW, 6091*
ULTRAVIOLET RAYS
  PHOTONS, ABSORPTION AND REEMISSION, 6269*
UREA, ETHYL NITROSO-
  REVIEW, 6044*
VIRUS, ADENO 5
  HOST-RANGE MUTANTS, 6339*
  TEMPERATURE SENSITIVE MUTANTS, 6339*
VIRUS, ADENO 12
  ANTIGENS, VIRAL, 6342*
VIRUS, EPSTEIN-BARR
  ANTIBODIES, VIRAL, 6314
  HISTOCOMPATIBILITY ANTIGENS, 6380*
  LEUKOCYTES, 6314
VIRUS, GRAFFI MURINE LEUKEMIA
  PHOSPHATASES, 6454*
VIRUS, HERPES
  DNA REPAIR, REVIEW, 6020
VIRUS, HERPES SIMPLEX 1
  CELLS, CULTURED, 6317
  ULTRAVIOLET RAYS, 6317
VIRUS, HERPES SIMPLEX 2
  CELLS, CULTURED, 6317
  ULTRAVIOLET RAYS, 6317
VIRUS, MAREK'S DISEASE HERPES
  REVIEW, 6086*
VIRUS, MURINE LEUKEMIA
  IMMUNOSUPPRESSION, REVIEW, 6091*
VIRUS, MURINE SARCOMA
  IMMUNOSUPPRESSION, REVIEW, 6091*
VIRUS, POLYOMA
  IMMUNOSUPPRESSION, REVIEW, 6091*
VIRUS, RAUSCHER MURINE LEUKEMIA
  PHOSPHATASES, 6454*
  RNA, MESSENGER, 6284
  RNA, RIBOSOMAL, 6284
  RNA, VIRAL, 6284
VIRUS, RNA TUMOR
  TISSUE CULTURE, REVIEW, 6137*
VIRUS, ROUS SARCOMA
  GLUCOSE, 2-DEOXY-, 6281
  GLYCOPROTEINS, 6279
  PHOSPHOLIPIDS, 6281
  PLASMINOGEN, 6590*
VIRUS, SV40
  ANTIGENS, 6297
  CELL FUSION, 6338*
  CELL MEMBRANE, 6589*
  PHOSPHOPROTEINS, 6589*
  PROTEASE INHIBITORS, REVIEW, 6526*

  - PROTEIN KINASE, 6589*
  - SERUM, 6544

CELLS, CULTURED
- BURKITT'S LYMPHOMA
  - LYMPHOCYTE TRANSFORMATION, 6361
- CELL DIFFERENTIATION
  - CELL MEMBRANE, 6135*
  - CELL TRANSFORMATION, NEOPLASTIC, 6135*
- CELL MEMBRANE
  - CELL TRANSFORMATION, NEOPLASTIC, 6135*
  - DNA REPLICATION, 6135*
- CELL TRANSFORMATION, NEOPLASTIC
  - CELL CYCLE KINETICS, 6135*
- DNA REPLICATION
  - CELL TRANSFORMATION, NEOPLASTIC, 6135*
- ETHANE, 1,1,1-TRICHLORO-2,2-BIS(P-CHLOROPHENYL)-
  - RETENTION, 6216*
- FIBROBLASTS
  - CELL DIVISION, 6543
- FORMAMIDINE, N'-(4-CHLORO-O-TOLYL)-N,N-DIMETHYL-
  - RETENTION, 6216*
- GUANIDINE, 1-METHYL-3-NITRO-1-NITROSO-
  - DNA REPAIR, 6214*
  - TRANSFERASES, 6338*
- HEPATOMA
  - M-TOLUIDINE, N,N-DIMETHYL-4-(PHENYLAZO)-, 6144
- INFECTIOUS MONONUCLEOSIS
  - LYMPHOCYTE TRANSFORMATION, 6361
- MELANOMA
  - ULTRASTRUCTURAL STUDY, 6404
- MENINGIOMA
  - CHROMOSOMES, 6437*
  - CONTACT INHIBITION, 6437*
- OUABAIN
  - TRANSFERASES, 6338*
- TERATOID TUMOR
  - CELL DIFFERENTIATION, REVIEW, 6129*
- URIDINE, 5-BROMO-2'-DEOXY-
  - DNA REPLICATION, 6579*
- URIDINE, 2'-DEOXY-5-IODO-
  - CELL TRANSIT TIME, 6509
  - DNA REPLICATION, 6579*
- VIRUS, AVIAN MYELOBLASTOSIS
  - VIRUS REPLICATION, 6277
- VIRUS, EPSTEIN-BARR
  - LYMPHOCYTE TRANSFORMATION, 6312, 6361
  - VIRUS REPLICATION, 6312
- VIRUS, HERPES SIMPLEX 1
  - CELL TRANSFORMATION, NEOPLASTIC, 6317
  - THYMIDINE KINASE, 6317
- VIRUS, HERPES SIMPLEX 2
  - CELL TRANSFORMATION, NEOPLASTIC, 6317
  - THYMIDINE KINASE, 6317
- VIRUS, RAUSCHER MURINE LEUKEMIA
  - CELL DIFFERENTIATION, 6288

CELLULAR INCLUSIONS
- BRAIN DISEASES
  - ULTRASTRUCTURAL STUDY, 6443*
- COLONIC NEOPLASMS
  - NEOPLASMS, MULTIPLE PRIMARY, 6479
  - PANCREAS, 6479*
- FIBROSARCOMA
  - VIRUS, GUINEA PIG HERPES, 6300
- HEAVY CHAIN DISEASE
  - LYMPHOCYTES, 6364
  - PLASMA CELLS, 6364
- LEUKEMIA, LYMPHOBLASTIC
  - CASE REPORT, 6455*
  - ULTRASTRUCTURAL STUDY, 6455*
- LUPUS ERYTHEMATOSUS, SYSTEMIC
  - PAROTID GLAND, 6479*
  - ULTRASTRUCTURAL STUDY. 6443*
- MACROGLOBULINEMIA
  - LYMPHOCYTES, 6364
  - PLASMA CELLS, 6364
- MULTIPLE MYELOMA
  - LYMPHOCYTES, 6364
  - PLASMA CELLS, 6364
- PANCREATIC NEOPLASMS
  - ISLET CELL TUMOR, 6479*
  - NEOPLASMS, MULTIPLE PRIMARY, 6479
- VIRUS, CYTOMEGALO
  - ISOLATION AND CHARACTERIZATION, 6280

CENTRAL NERVOUS SYSTEM
- LEUKEMIA
  - NEOPLASM METASTASIS, REVIEW, 6127

CERVIX NEOPLASMS
- ADENOCARCINOMA
  - CONNECTIVE TISSUE, HISTOLOGICAL STUDY, 6475*
- AGE FACTORS
  - EPIDEMIOLOGY, 6109*
- CARCINOMA
  - ULTRASTRUCTURAL STUDY, 6477*
- CARCINOMA, EPIDERMOID
  - CONNECTIVE TISSUE, HISTOLOGICAL STUDY, 6475*
- CARCINOMA IN SITU
  - EPIDEMIOLOGY, 6109*
  - EPIDEMIOLOGY, REVIEW, 6085*
  - ULTRASTRUCTURAL STUDY, 6477*
- CONTRACEPTIVES, ORAL
  - PRECANCEROUS CONDITIONS, 6152
- CYTODIAGNOSIS
  - EPIDEMIOLOGY, 6109*
- EPIDEMIOLOGY
  - RISK FACTORS, 6109*
- EPITHELIAL CELLS
  - ULTRASTRUCTURAL STUDY, 6477*
- FOLIC ACID
  - CONTRACEPTIVES, ORAL, 6152
- HISTOCOMPATIBILITY ANTIGENS
  - IMMUNE RESPONSE, REVIEW, 6028
- MUCOPOLYSACCHARIDES
  - NEOPLASM METASTASIS, 6475*
- NEOPLASM METASTASIS
  - CONNECTIVE TISSUE, HISTOLOGICAL STUDY, 6475*
- PRECANCEROUS CONDITIONS
  - CELL DIFFERENTIATION, REVIEW, 6123*
  - CONTRACEPTIVES, ORAL, 6152
  - EPIDEMIOLOGY, REVIEW, 6085*

    ULTRASTRUCTURAL STUDY, 6477*
  TRICHOMONAS VAGINALIS
    EPIDEMIOLOGY, REVIEW, 6085*
  VIRUS, HERPES
    EPIDEMIOLOGY, REVIEW, 6085*
  VIRUS, HERPES SIMPLEX 2
    CARCINOGENIC POTENTIAL, REVIEW, 6017

CHELATING AGENTS
  CARCINOMA, EPIDERMOID
    CLOSTRIDIOPEPTIDASE A, 6416
  MELANOMA
    CLOSTRIDIOPEPTIDASE A, 6416

CHLORAMPHENICOL
  ANEMIA, APLASTIC
    CHROMOSOME ABERRATIONS, 6434*

CHLOROFORM
  HEPATOMA
    CARCINOGENIC POTENTIAL, RAT, MOUSE, 6211*
    DOSE-RESPONSE STUDY, RAT, MOUSE, 6211*
  KIDNEY NEOPLASMS
    CARCINOGENIC POTENTIAL, RAT, MOUSE, 6211*
    DOSE-RESPONSE STUDY, RAT, MOUSE, 6211*
  WATER POLLUTANTS
    DISTRIBUTION, REVIEW, 6064*

CHOLANGIOMA
  DIGESTIVE SYSTEM NEOPLASMS
    EPIDEMIOLOGY, HAMSTER, 6432

CHOLANTHRENE, 11,12-EPOXY-11,12-DIHYDRO-3-METHYL-
  P-DIOXANE
    DIHYDRODIOL FORMATION, 6205*

CHOLANTHRENE, 3-METHYL-
  BENZO(A)PYRENE
    METABOLISM, 6199*
  BONE NEOPLASMS
    TRANSPLANTATION IMMUNOLOGY, 6373
  CELL TRANSFORMATION, NEOPLASTIC
    K-REGION EPOXIDES, REVIEW, 6033*
  DIMETHYLAMINE, N-NITROSO-
    MUTAGENIC ACTIVITY, 6182*
    OXIDOREDUCTASES, 6182*
  ETHANOL, 2,2',2''-NITRILOTRIS-
    CO-CARCINOGENIC ACTIVITY, 6155
  FIBROBLASTS
    CELL TRANSFORMATION, NEOPLASTIC, REVIEW, 6036*
    SURFACE PROPERTIES, REVIEW, 6036*
  FIBROSARCOMA
    ADRENAL CORTEX HORMONES, 6227*
    IMMUNITY, ACTIVE, 6393*
    IMMUNITY, CELLULAR, 6388*, 6393*
  SARCOMA
    TRANSPLANTATION IMMUNOLOGY, 6373

CHOLESTASIS
  LIVER DISEASES
    ANIMAL MODEL, REVIEW, 6046*

CHOLESTEROL
  HEPATOMA
    SERUM LEVELS, 6575

CHONDROSARCOMA
  BONE NEOPLASMS
    BIOCHEMICAL STUDY, REVIEW, 6103*

CHORIOCARCINOMA
  TESTICULAR NEOPLASMS
    EPIDEMIOLOGY, 6495
  UTERINE NEOPLASMS
    EPIDEMIOLOGY, REVIEW, 6110*

CHROMATIDS
  ATEBRINE
    EXCHANGE POINTS, 6212*

CHROMATIN
  AFLATOXIN B1
    BINDING, 6139
    LIVER, RAT, 6139
  AFLATOXIN G1
    BINDING, 6139
    LIVER, RAT, 6139
  HEPATOMA
    RADIATION, IONIZING, 6267*
  RADIATION, IONIZING
    DNA, 6268*

CHROMIC ACID, CALCIUM SALT, DIHYDRATE
  RESPIRATORY TRACT NEOPLASMS
    EPIDEMIOLOGY, REVIEW, 6006

CHROMIC ACID, LEAD(2+) SALT
  RESPIRATORY TRACT NEOPLASMS
    EPIDEMIOLOGY, REVIEW, 6006

CHROMIUM
  ANIMALS, LABORATORY
    CARCINOGENIC ACTIVITY, REVIEW, 6006
  NEOPLASMS
    OCCUPATIONAL HAZARD, 6051*
  RESPIRATORY TRACT NEOPLASMS
    EPIDEMIOLOGY, REVIEW, 6006

CHROMOSOME ABERRATIONS
  ANEMIA, APLASTIC
    CAFFEINE, 6434*
    GENETICS, 6491
    RADIATION, IONIZING, 6434*
    ULTRAVIOLET RAYS, 6434*
  ATEBRINE
    G-BANDING, 6212*
    LYMPHOCYTES, 6212*
  CARCINOGEN, CHEMICAL
    SCREENING METHODS, REVIEW, 6032*
  CHLORAMPHENICOL
    ANEMIA, APLASTIC, 6434*
  CYCLOPHOSPHAMIDE
    ARTHRITIS, 6166
  GOLD
    ARTHRITIS, 6166
  LEUKEMIA
    VIRUS, JM-V HERPES, 6324*
  LEUKEMIA, LYMPHOCYTIC
    LYMPHOCYTES, 6358, 6390*
  LEUKEMIA, MYELOCYTIC

    - CASE REPORT, 6414, 6419
    - CHROMOSOMES, HUMAN, 1-3, 6414
    - CHROMOSOMES, HUMAN, 16-18, 6415
    - CHROMOSOMES, HUMAN, 21-22, 6414
    - PLANT AGGLUTININS, 6419
  - MANNITOL
    - ARTHRITIS, 6166
  - MELANOMA
    - CELL LINE, AMELANOTIC, 6482*
  - METHANESULFONIC ACID, ETHYL ESTER
    - ANEMIA, APLASTIC, 6434*
  - MITOMYCIN C
    - ANEMIA, APLASTIC, 6434*
  - MYELOPROLIFERATIVE DISORDERS
    - CASE REPORT, 6419
    - PLANT AGGLUTININS, 6419
  - PLASMACYTOMA
    - G-BANDING, 6423
  - PURINE, 6-((1-METHYL-4-NITROIMIDAZOL-5-YL)THIO)-
    - ARTHRITIS, 6166
  - 3,5-PYRAZOLIDINEDIONE, 4-BUTYL-1,2-DIPHENYL-
    - ARTHRITIS, 6166
  - RADIATION INJURIES
    - DOSE-RESPONSE STUDY, LYMPHOCYTES, 6234
  - RADIATION, IONIZING
    - BENZENE, 6252*
    - DOSE-RESPONSE STUDY, LYMPHOCYTES, 6234
    - G-BANDING, 6212*
    - LEUKOCYTES, 6252*
  - P-TOLUAMIDE, N-ISOPROPYL-ALPHA-(2-METHYLHYDRAZINO)-
    - ARTHRITIS, 6166
  - VIRUS, JM-V HERPES
    - BONE MARROW CELLS, 6324*
    - LYMPHOCYTES, 6324*

- CHROMOSOME ABNORMALITIES
  - ANEMIA, APLASTIC
    - DIAGNOSIS AND PROGNOSIS, REVIEW, 6122*
    - GENETICS, 6421
  - CARCINOMA IN SITU
    - REVIEW, 6119*
  - CELL TRANSFORMATION, NEOPLASTIC
    - REVIEW, 6119*
  - DERMATITIS EXFOLIATIVA
    - G-BANDING, 6438*
  - ERYTHROLEUKEMIA
    - BONE MARROW CELLS, 6453*
    - CASE REPORT, 6453*
    - CHROMOSOMES, HUMAN, 16-18, 6453*
    - Q-BANDING, 6415
  - LEUKEMIA
    - REVIEW, 6119*
  - LEUKEMIA, MYELOBLASTIC
    - Q-BANDING, 6415
    - TREATMENT AND PROGNOSIS, 6415
  - LEUKEMIA, MYELOCYTIC
    - Q-BANDING, 6415
    - TREATMENT AND PROGNOSIS, 6415
  - LEUKEMIA, RADIATION-INDUCED
    - EPIDEMIOLOGY, REVIEW, 6012
  - LYMPHOMA
    - REVIEW, 6119*
  - MACROGLOBULINEMIA
    - REVIEW, 6119*
  - MULTIPLE MYELOMA
    - REVIEW, 6119*

- CHROMOSOMES
  - AFLATOXIN B1
    - CELL TRANSFORMATION, NEOPLASTIC, REVIEW, 6120*
  - ANTINEOPLASTIC AGENTS
    - SPERMATOZOA, 6185*
  - BENZO(A)PYRENE
    - CELL TRANSFORMATION, NEOPLASTIC, REVIEW, 6120*
  - CARCINOGEN, CHEMICAL
    - MUTAGENIC ACTIVITY, REVIEW, 6070*
  - CARCINOMA, EHRLICH TUMOR
    - HETEROCHROMATIN, 6481*
  - DNA REPLICATION
    - IMMUNOLOGIC TECHNICS, 6579*
  - HEPATOMA
    - BANDING PATTERNS, 6424
  - MENINGIOMA
    - CELL LINE, 6437*
    - CONTACT INHIBITION, 6437*
  - 1,2-OXATHIOLANE, 2,2-DIOXIDE
    - CELL TRANSFORMATION, NEOPLASTIC, REVIEW, 6120*
  - QUINOLINE, 4-NITRO-, 1-OXIDE
    - CELL TRANSFORMATION, NEOPLASTIC, REVIEW, 6120*
  - RADIATION, IONIZING
    - MUTAGENIC ACTIVITY, REVIEW, 6070*
    - SPERMATOZOA, 6185*
  - UREA, 1-BUTYL-1-NITROSO-
    - BONE MARROW CELLS, 6219*
    - LYMPHOCYTES, 6219*
  - URIDINE, 5-BROMO-2'-DEOXY-
    - DNA REPLICATION, 6579*
  - URIDINE, 2'-DEOXY-5-IODO-
    - DNA REPLICATION, 6579*
  - VIRUS, RNA TUMOR
    - CELL TRANSFORMATION, NEOPLASTIC, REVIEW, 6120*

- CHROMOSOMES, HUMAN, 1-3
  - LEUKEMIA, MYELOCYTIC
    - CHROMOSOME ABERRATIONS, 6414

- CHROMOSOMES, HUMAN, 16-18
  - ANEMIA, APLASTIC
    - GENETICS, 6421
  - ERYTHROLEUKEMIA
    - CHROMOSOME ABNORMALITIES, 6453*
  - LEUKEMIA, MYELOCYTIC
    - CHROMOSOME ABERRATIONS, 6415

- CHROMOSOMES, HUMAN, 21-22
  - GENETICS
    - BAND Q11/Q12, 6452*
  - LEUKEMIA, MYELOCYTIC
    - BAND 22Q12, 6452*
    - CASE REPORT, TRANSLOCATION, 6451
    - CELL DIFFERENTIATION, 6409
    - CHROMOSOME ABERRATIONS, 6414
    - DIAGNOSIS AND TREATMENT, REVIEW, 6128*

- CHRYSOTILE
  - SEE ASBESTOS

- CIRCADIAN RHYTHM
  - PROLACTIN
    - DIETARY FATS, 6228*

- CLOSTRIDIOPEPTIDASE A
  - CARCINOMA, EPIDERMOID
    - CHELATING AGENTS, 6416
    - PIPERAZINES, 6416
  - CELL MEMBRANE
    - PROTEINS, 6592*
  - FIBROBLASTS
    - CELL ADHESION, 6592*
    - PROTEINS, 6592*
  - MELANOMA
    - CHELATING AGENTS, 6416
    - PIPERAZINES, 6416
  - 2,6-PIPERAZINEDIONE, 4,4'-PROPYLENEDI-
    - NEOPLASM METASTASIS, 6416

- COAL TAR
  - SKIN NEOPLASMS
    - OCCUPATIONAL HAZARD, REVIEW, 6004

- COBALT
  - VIRUS, AVIAN MYELOBLASTOSIS
    - DNA NUCLEOTIDYLTRANSFERASES, 6578*

- COBALT CHLORIDE
  - DIETHYLAMINE, N-NITROSO-
    - CELL TRANSFORMATION, NEOPLASTIC, 6160
  - NASOPHARYNGEAL NEOPLASMS
    - DIETHYLAMINE, N-NITROSO-, 6160

- COLCHICINE, N-DEACETYL-N-METHYL-
  - MICROTUBULES
    - RADIATION EFFECTS, HAIR FOLLICLES, MOUSE, 6258*
  - RADIATION, IONIZING
    - MICROTUBULES, 6258*

- COLLAGEN
  - MELANOMA
    - HISTOLOGICAL STUDY, 6403
  - NEVUS, PIGMENTED
    - HISTOLOGICAL STUDY, 6403

- COLONIC NEOPLASMS
  - ADENOCARCINOMA
    - HYDRAZINE, 1,2-DIMETHYL-, 6225*
    - LACTATE DEHYDROGENASE ISOENZYMES, 6560
    - NEOPLASM TRANSPLANTATION, 6225*
  - AGE FACTORS
    - EPIDEMIOLOGY, JAPAN, 6508
  - BILE ACIDS AND SALTS
    - EPIDEMIOLOGY, REVIEW, 6105*
  - DIET
    - EPIDEMIOLOGY, REVIEW, 6105*
  - DNA REPLICATION
    - AGGLUTINATION, 6384*
  - EPIDEMIOLOGY
    - SCREENING TECHNIQUES, 6107*
  - LACTATE DEHYDROGENASE ISOENZYMES
    - TISSUE LEVELS, 6560
  - LYMPHOCYTES
    - DNA REPLICATION, 6384*
  - METAPLASIA
    - LACTATE DEHYDROGENASE ISOENZYMES, 6560
  - NEOPLASMS, MULTIPLE PRIMARY
    - CELLULAR INCLUSIONS, 6479*
  - PANCREAS
    - CELLULAR INCLUSIONS, 6479*
  - POLYPS
    - CHILD, 6470*
    - DNA REPLICATION, 6552
    - GENETICS, 6470*, 6552
    - PRECANCEROUS CONDITIONS, 6552
    - THYMIDINE INCORPORATION, 6552
  - PRECANCEROUS CONDITIONS
    - CELL DIFFERENTIATION, REVIEW, 6123*
  - STEROLS
    - EPIDEMIOLOGY, REVIEW, 6105*
  - TISSUE EXTRACTS
    - DNA REPLICATION, 6384*
    - LYMPHOCYTE TRANSFORMATION, 6384*

- COMPLEMENT
  - FIBROBLASTS
    - HYBRID CELLS, 6546
  - HEPATOMA
    - HYBRID CELLS, 6546
  - LYMPHOCYTES
    - CELLS, CULTURED, REVIEW, 6097*
  - ONCOGENIC VIRUSES
    - VIRUS REPLICATION, 6282
  - VIRUS, MURINE LEUKEMIA
    - VIRUS REPLICATION, 6282

- CONCANAVALIN A
  - HEPATOMA
    - LYMPHOCYTE TRANSFORMATION, 6366
  - B-LYMPHOCYTES
    - IMMUNE RESPONSE, AKR MICE, 6360
  - T-LYMPHOCYTES
    - IMMUNE RESPONSE, AKR MICE, 6360
  - PEPTIDE HYDROLASES
    - AGGLUTINATION, 6593*
  - SMOKING
    - MACROPHAGES, 6173*
  - TRYPSIN
    - FIBROBLASTS, 6593*

- CONTACT INHIBITION
  - MENINGIOMA
    - CELL LINE, 6437*
    - CHROMOSOMES, 6437*
  - QUINOLINE, 4-NITRO-, 1-OXIDE
    - CELL TRANSFORMATION, NEOPLASTIC, 6209*

- CONTRACEPTIVES, ORAL
  - ANEMIA, MACROCYTIC
    - FOLIC ACID, 6152
  - BREAST NEOPLASMS
    - CARCINOGENIC POTENTIAL, REVIEW, 6007, 6009
  - CERVIX NEOPLASMS
    - FOLIC ACID, 6152
    - PRECANCEROUS CONDITIONS, 6152
  - GYNECOLOGIC NEOPLASMS
    - CARCINOGENIC POTENTIAL, REVIEW, 6007
  - HEPATOMA
    - EPIDEMIOLOGY, 6066*, 6067*, 6149
    - NEOPLASM RUPTURE, CASE REPORT,

    - 6527*
    - RISK FACTORS, 6230*, 6231*
    - SCREENING, 6067*
    - STATISTICAL ANALYSIS, 6066*
  - LIVER NEOPLASMS
    - ADENOMA, 6151
    - CASE REPORT, 6151
    - EPIDEMIOLOGY, 6149
    - HAMARTOMA, 6149
    - HYPERPLASIA, 6149
  - UTERINE NEOPLASMS
    - REVIEW, 6068*

COPPER
  - CYTOCHROME OXIDASE
    - FREE RADICALS, 6584*

COPPER SULFATE
  - DIETHYLAMINE, N-NITROSO-
    - CELL TRANSFORMATION, NEOPLASTIC, 6160

CORTICOSTERONE
  - VIRUS, MURINE SARCOMA
    - CELL TRANSFORMATION, NEOPLASTIC, REVIEW, 6016

CORTICOTROPIN
  - ADRENAL CORTEX HORMONES
    - CELL DIFFERENTIATION, 6566
    - STEROIDS, 6566
  - CELL DIFFERENTIATION
    - PREGNENOLONE, 6566
  - LUNG NEOPLASMS
    - TRANSPLANTATION, HETEROLOGOUS, 6375
  - TISSUE CULTURE
    - ADRENAL CORTEX HORMONES, 6566

CORTISONE
  - HELA CELLS
    - OSTEOGENESIS, 6428

COUMARIN, 7-ETHOXY-
  - LIVER
    - METABOLSIM, 6196*
  - PLACENTA
    - METABOLISM, 6196*
    - METABOLSIM, 6196*
  - SMOKING
    - METABOLSIM, 6196*

CRANIOPHARYNGIOMA
  - PITUITARY NEOPLASMS
    - EPIDEMIOLOGY, REVIEW, 6101*

CROCIDOLITE
  - SEE ASBESTOS

CRYPTORCHISM
  - TESTICULAR NEOPLASMS
    - DISGERMINOMA, 6528*
    - EPIDEMIOLOGY, 6528*

CUSHING'S SYNDROME
  - ADRENAL GLAND NEOPLASMS
    - EPIDEMIOLOGY, REVIEW, 6102*
    - STEROIDS, REVIEW, 6102*
  - PITUITARY NEOPLASMS
    - EPIDEMIOLOGY, REVIEW, 6101*

CYCLIC AMP
  - SEE ADENOSINE CYCLIC 3',5' MONOPHOSPHATE

CYCLOHEXANE, 1,2,3,4,5,6-HEXACHLORO-, ALPHA-ISOMER
  - HEPATOMA
    - ULTRASTRUCTURAL STUDY, 6158
  - LIVER NEOPLASMS
    - NEOPLASM REGRESSION, SPONTANEOUS, 6158
    - PRECANCEROUS CONDITIONS, 6158

CYCLOHEXANECARBOXYLIC ACID
  - 1-CYCLOHEXENE-1-CARBOXYLIC ACID, 3,4, TRIHYDROXY-
    - METABOLISM, RAT, 6162

1-CYCLOHEXENE-1-CARBOXYLIC ACID, 3,4,5-TRIHYDROXY-
  - BACTERIA
    - METABOLISM, RAT, 6162
  - CYCLOHEXANECARBOXYLIC ACID
    - METABOLISM, RAT, 6162
  - GASTROINTESTINAL SYSTEM
    - METABOLISM, RAT, 6162

CYCLOHEXIMIDE
  - ARTHRITIS, RHEUMATOID
    - CARCINOGENIC POTENTIAL, 6167
  - VIRUS, ADENO 2
    - VIRAL PROTEINS, 6306
  - VIRUS, ROUS SARCOMA
    - PLASMINOGEN, 6590*

CYCLOPHOSPHAMIDE
  - ARYL HYDROCARBON HYDROXYLASES
    - HALF-LIFE, 6198*
  - CHROMOSOME ABERRATIONS
    - ARTHRITIS, 6166
  - LEUKEMIA, MYELOBLASTIC
    - CASE REPORT, 6444*
    - GLOMERULONEPHRITIS, 6444*

CYSTEINE
  - DNA, MITOCHONDRIAL
    - DNA REPLICATION, 6551

CYSTITIS
  - BLADDER NEOPLASMS
    - CASE REPORT, 6450*

CYTOCHROME OXIDASE
  - COPPER
    - FREE RADICALS, 6584*
  - FREE RADICALS
    - CELL TRANSFORMATION, NEOPLASTIC, 6584*
  - HEME
    - FREE RADICALS, 6584*
  - OXYGEN
    - CELL TRANSFORMATION, NEOPLASTIC, 6584*

CYTOCHROME P-450
  - BENZO(A)PYRENE
    - PHENOL, (1,1-DIMETHYLETHYL)-4-

    METHOXY-, 6146
  NAPHTHALENE
    DIHYDRODIOL EPOXIDES, 6191*
    METABOLISM, RAT, 6191*

TOCHROMES
  DIMETHYLAMINE, N-NITROSO-
    MUTAGENIC ACTIVITY, 6182*
    OXIDOREDUCTASES, 6182*

TOSINE, 1-BETA-D-ARABINOFURANOSYL-
  CARCINOGEN, CHEMICAL
    SCREENING METHOD, 6187*

TOTOXICITY TESTS, IMMUNOLOGIC
  BREAST NEOPLASMS
    RNA, 6343
  MELANOMA
    RNA, 6343
  RNA
    ANTIGENS, NEOPLASM, 6343
  STOMACH NEOPLASMS
    RNA, 6343

OXYRIBONUCLEASE
  RADIATION, IONIZING
    CELL NUCLEUS, 6248*

RMATITIS EXFOLIATIVA
  CHROMOSOME ABNORMALITIES
    G-BANDING, 6438*
  DNA
    CYTOPHOTOMETRIC STUDY, 6438*

RMOID CYST
  BRAIN NEOPLASMS
    CASE REPORT, 6459*

XAMETHASONE
  HEPATOMA
    CELL MEMBRANE, 6594*
    INSULIN, 6583*
    PEPTIDE HYDROLASES, 6594*
    TYROSINE AMINOTRANSFERASE, 6583*, 6594*
  VIRUS, C-TYPE RNA TUMOR
    ANTIGENS, VIRAL, 6296
    VIRUS REPLICATION, 6296

XTRAN SULFATE
  HEPATOMA
    LYMPHOCYTE TRANSFORMATION, 6366
  B-LYMPHOCYTES
    CELL DIFFERENTIATION, 6368
    DNA REPLICATION, 6368

ABETES MELLITUS
  ANEMIA, APLASTIC
    EPIDEMIOLOGY, 6434*

BENZ(A,H)ANTHRACENE
  CELL TRANSFORMATION, NEOPLASTIC
    K-REGION EPOXIDES, REVIEW, 6033*
  TETRAHYMENA PYRIFORMIS
    PHOTOTOXIC EFFECTS, 6147

BUTYRYL CYCLIC AMP
  ESTRADIOL
    UTERUS, MOUSE, 6568

DIELDRIN
  FORMAMIDINE, N'-(4-CHLORO-O-TOLYL)-N,N-DIMETHYL-
    RETENTION, 6216*
  GASTROINTESTINAL NEOPLASMS
    FOOD CONTAMINATION, 6058*
  UROGENITAL NEOPLASMS
    FOOD CONTAMINATION, 6058*

DIET
  BREAST NEOPLASMS
    IODINE, 6535*
  COLONIC NEOPLASMS
    EPIDEMIOLOGY, REVIEW, 6105*
  GASTROINTESTINAL NEOPLASMS
    EPIDEMIOLOGY, REVIEW, 6059*
  GYNECOLOGIC NEOPLASMS
    EPIDEMIOLOGY, REVIEW, 6059*
  NEOPLASMS
    EPIDEMIOLOGY, 6534*
  PYRAZOLE-1-ACETAMIDE, 3,4,5-TRIBROMO-N,N,ALPHA-TRIMETHYL-
    CARCINOGENIC POTENTIAL, RAT, 6224*
    MUTAGENIC POTENTIAL, RAT, 6224*

DIETARY FATS
  BREAST NEOPLASMS
    EPIDEMIOLOGY, REVIEW, 6057*
  HEPATOMA
    HISTOLOGICAL STUDY, MOUSE, 6143
  PROLACTIN
    CIRCADIAN RHYTHM, 6228*
    LH, 6228*

DIETHYLAMINE, 2,2'-DICHLORO-N-METHYL-, HYDROCHLORIDE
  DNA
    ALKYLATION, 6153
    SPECTRUM ANALYSIS, 6153

DIETHYLAMINE, N-NITROSO-
  ANILINE, N,N-DIMETHYL-P-PHENYLAZO-
    HEPATECTOMY, 6181*
    OXIDATIVE PHOSPHORYLATION, 6181*
  COBALT CHLORIDE
    CELL TRANSFORMATION, NEOPLASTIC, 6160
  COPPER SULFATE
    CELL TRANSFORMATION, NEOPLASTIC, 6160
  HEPATOMA
    HEPATECTOMY, 6181*
    OXIDATIVE PHOSPHORYLATION, 6181*
  KIDNEY
    DNA, ALKYLATION, 6178*
  LARYNGEAL NEOPLASMS
    PAPILLOMA, 6179*
    SMOKING, 6179*
  LIVER
    DNA, ALKYLATION, 6178*
  LIVER NEOPLASMS
    SMOKING, 6179*
  NASOPHARYNGEAL NEOPLASMS
    COBALT CHLORIDE, 6160
    LIVER NEOPLASMS, 6160
    NEUROEPITHELIOMA, 6160
  SALMONELLA TYPHIMURIUM
    MUTAGENIC ACTIVITY, 6138
  SMOKING

    COCARCINOGENIC EFFECT, 6179*

DIETHYLNITROSAMINE
    SEE DIETHYLAMINE, N-NITROSO-

DIGESTIVE SYSTEM NEOPLASMS
    ANEMIA, APLASTIC
        GENETICS, 6420
    ANGIOSARCOMA
        EPIDEMIOLOGY, HAMSTER, 6432
    CHOLANGIOMA
        EPIDEMIOLOGY, HAMSTER, 6432
    INCIDENCE RATES
        EPIDEMIOLOGY, INDIA, 6511
    PAPILLOMA
        EPIDEMIOLOGY, HAMSTER, 6432
    SEX FACTORS
        EPIDEMIOLOGY, HAMSTER, 6432

DIMETHYLAMINE, N-NITRO-
    HEPATOMA
        DOSE-RESPONSE STUDY, MOUSE AND RAT, 6180*
    KIDNEY NEOPLASMS
        ADENOCARCINOMA, 6180*
        DOSE-RESPONSE STUDY, MOUSE AND RAT, 6180*

DIMETHYLAMINE, N-NITROSO-
    AROCLOR 1254
        MUTAGENIC ACTIVITY, 6182*
        OXIDOREDUCTASES, 6182*
    BARBITURIC ACID, 5-ETHYL-5-PHENYL-
        MUTAGENIC ACTIVITY, 6182*
        OXIDOREDUCTASES, 6182*
    BENZO(A)PYRENE
        MUTAGENIC ACTIVITY, 6182*
    CHOLANTHRENE, 3-METHYL-
        MUTAGENIC ACTIVITY, 6182*
        OXIDOREDUCTASES, 6182*
    CYTOCHROMES
        MUTAGENIC ACTIVITY, 6182*
        OXIDOREDUCTASES, 6182*
    DNA REPAIR
        SCREENING METHODS, REVIEW, 6032*
    DNA, SINGLE STRANDED
        LIVER, RAT, 6170*
    ESCHERICHIA COLI
        IN VITRO PRODUCTION, 6161
        NITRASE-POSITIVE BACTERIA, 6161
    KIDNEY
        DNA, ALKYLATION, 6178*
    KLEBSIELLA
        IN VITRO PRODUCTION, 6161
        NITRASE-POSITIVE BACTERIA, 6161
    LIVER
        DNA, ALKYLATION, 6178*
    PROTEUS
        IN VITRO PRODUCTION, 6161
        NITRASE-POSITIVE BACTERIA, 6161
    SALMONELLA TYPHIMURIUM
        MUTAGENIC ACTIVITY, 6138
    VALERIC ACID, 2,2-DIPHENYL-, 2-(DIETHYLAMINO)ETHYL ESTER HCL
        MUTAGENIC ACTIVITY, 6182*

DIMETHYLAMINOAZOBENZENE
    SEE ANILINE, N,N-DIMETHYL-P-PHENYLAZO-

DIMETHYLBENZANTHRACENE
    SEE BENZ(A)ANTHRACENE, 7,12-DIMETHYL-

P-DIOXANE
    BENZ(A)ANTHRACENE-5,6-DIONE, 7,12-DIMETHYL-
        DIHYDRODIOL FORMATION, 6205*
    BENZ(A)ANTHRACENE, 5,6-EPOXY-5,6-DIHYDRO-
        DIHYDRODIOL FORMATION, 6205*
    CHOLANTHRENE, 11,12-EPOXY-11,12-DIHYDRO-3-METHYL-
        DIHYDRODIOL FORMATION, 6205*

DIPROPYLAMINE, N-NITROSO-
    KIDNEY NEOPLASMS
        CARCINOGENIC METABOLITE, 6163
    LIVER NEOPLASMS
        CARCINOGENIC METABOLITE, 6163
    RESPIRATORY TRACT NEOPLASMS
        CARCINOGENIC METABOLITE, 6163

DISGERMINOMA
    GENETICS
        CASE REPORT, 46, XY KARYOTYPE, 6435*
        EPIDEMIOLOGY, REVIEW, 6113*
    TESTICULAR NEOPLASMS
        CRYPTORCHISM, 6528*
        EPIDEMIOLOGY, 6495
        17-KETOSTEROIDS, REVIEW, 6111*

DNA
    ACETOHYDROXAMIC ACID, N-FLUOREN-2-YL
        BINDING, LIVER, 6142
    ALKYLATING AGENTS
        MUTAGENIC ACTIVITY, REVIEW, 6043
    BENZ(A)ANTHRACENE
        CARCINOGENIC METABOLITE, 6203*
        DIOL-EPOXIDES, 6203*
        K-REGION EPOXIDES, 6203*
    CARBAMIC ACID, ETHYL ESTER
        BINDING SITES, LIVER, RAT, 6208
    CARCINOGEN, CHEMICAL
        METHYLATION, REVIEW, 6038*
        REVIEW, 6041*
    CARCINOGENIC METABOLITE
        REVIEW, 6041*
    CARRIER PROTEINS
        SUBCELLULAR FRACTIONS, FIBROBLA
        6550
    DERMATITIS EXFOLIATIVA
        CYTOPHOTOMETRIC STUDY, 6438*
    DIETHYLAMINE, 2,2'-DICHLORO-N-METHY
      HYDROCHLORIDE
        ALKYLATION, 6153
        SPECTRUM ANALYSIS, 6153
    ETHYLAMINE, 2,2-DICHLORO-N,N-DIMETH
        ALKYLATION, 6153
        SPECTRUM ANALYSIS, 6153
    FIBROBLASTS
        CARRIER PROTEINS, 6550
    HELA CELLS
        ULTRAVIOLET RAYS, 6261*
    RADIATION, IONIZING
        CELL NUCLEUS, 6248*
        CHROMATIN, 6268*

        DNA-PROTEIN CROSS-LINKING, 6268*
        DOSE-RESPONSE STUDY, HAMSTER, 6272*
        GLYCEROL, 6270*
        METHANE, SULFINYLBIS-, 6270*
        RADIATION EFFECTS, 6259*
        RADIATION-PROTECTIVE AGENTS, 6270*
    ULTRAVIOLET RAYS
        ADDUCT FORMATION, REVIEW, 6077*
        MUTAGENIC ACTIVITY, REVIEW, 6043*
        RADIATION EFFECTS, HAMSTER OVARY, MOUSE, 6261*

A, BACTERIAL
    PLANT TUMORS
        AGROBACTERIUM TUMEFACIENS, 6169*
        EXTRACHROMOSOMAL INHERITANCE, 6169*

A, CIRCULAR
    VIRUS, AVIAN SARCOMA
        ISOLATION AND CHARACTERIZATION, 6322*
        ULTRASTRUCTURAL STUDY, 6322*
    VIRUS, EPSTEIN-BARR
        DNA REPLICATION, REVIEW, 6081*
    VIRUS, SV40
        NUCLEOPROTEINS, 6305

, MITOCHONDRIAL
    DNA REPLICATION
        ACTINOMYCIN D, 6551
        ALANINE, 6551
        CYSTEINE, 6551
        DNA POLYMERASE, 6551
        ETHANOL, 2-MERCAPTO-, 6551
        ETHYL ALCOHOL, 6551
        GLUTATHIONE, 6551
        METHIONINE, 6551
        N-PROPANOL, 6551
        THREITOL, 1,4-DITHIO-, 6551

, NEOPLASM
    LEUKEMIA, MYELOCYTIC
        TRANSPLANTATION, HOMOLOGOUS, 6299

NUCLEOTIDYLTRANSFERASES
    CATIONS, DIVALENT
        DNA REPLICATION, 6578*
    HEPATOMA
        ZINC, 6577*
    PROSTATE
        ISOLATION AND CHARACTERIZATION, 6320
    PROSTATIC NEOPLASMS
        PRECANCEROUS CONDITIONS, 6320
    RADIATION, IONIZING
        BINDING SITES, 6251*
    VIRUS, AVIAN MYELOBLASTOSIS
        COBALT, 6578*
        DNA REPLICATION, 6578*
        MAGNESIUM, 6578*
        MANGANESE, 6578*
        NICKEL, 6578*
        ZINC, 6578*

POLYMERASE
    SEE ALSO DNA NUCLEOTIDYLTRANSFERASES
    DNA, MITOCHONDRIAL
        DNA REPLICATION, 6551

DNA REPAIR
    ACETAMIDE, N-(ACETYLOXY)-N-9H-FLUOREN-2-YL-
        CAFFEINE, 6222*
    BENZ(A)ANTHRACENE, 7-BROMOMETHYL-
        CAFFEINE, 6222*
    CAFFEINE
        CELL TRANSFORMATION, NEOPLASTIC, REVIEW, 6010
    CARCINOGEN, CHEMICAL
        CELL TRANSFORMATION, NEOPLASTIC, REVIEW, 6010
        MUTAGENIC ACTIVITY, REVIEW, 6039*
        SCREENING METHOD, 6187*
        SCREENING METHODS, REVIEW, 6032*
    DIMETHYLAMINE, N-NITROSO-
        SCREENING METHODS, REVIEW, 6032*
    ENDONUCLEASES
        CELL TRANSFORMATION, NEOPLASTIC, REVIEW, 6010
    ETHIDIUM BROMIDE
        SCREENING METHODS, REVIEW, 6032*
    GUANIDINE, 1-METHYL-3-NITRO-1-NITROSO-
        CELLS, CULTURED, 6214*
    HELA CELLS
        GUANIDINE, 1-METHYL-3-NITRO-1-NITROSO-, 6214*
    HEPATOMA
        RADIATION, IONIZING, 6267*
    MUTAGENS
        REVIEW, 6043*
    PLATINUM, DIAMINEDICHLORO-
        CAFFEINE, 6222*
    QUINOLINE, 4-NITRO-, 1-OXIDE
        UREA, HYDROXY-, 6209*
    RADIATION, IONIZING
        AUTORADIOGRAPHIC STUDY, 6240*
        CAFFEINE, 6256*
        DNA, SINGLE STRANDED, 6251*
        DOSE-RESPONSE STUDY, EYE, RABBIT, 6241*
        ESCHERICHIA COLI, 6251*
        RADIATION-SENSITIZING AGENTS, 6256*
        TEMPERATURE, 6267*
    ULTRAVIOLET RAYS
        ANTIBODIES, 6254*
        CAFFEINE, 6256*
        CELL TRANSFORMATION, NEOPLASTIC, REVIEW, 6010
        PYRIMIDINES, 6254*
        RADIATION-SENSITIZING AGENTS, 6256*
    UREA, METHYL NITROSO-
        CAFFEINE, 6222*
    XERODERMA PIGMENTOSUM
        BLOOD GROUPS, 6118*
        CAFFEINE, 6247*
        GENETICS, 6239
        ULTRAVIOLET RAYS, 6239, 6247*

DNA REPLICATION
    CATIONS, DIVALENT
        DNA NUCLEOTIDYLTRANSFERASES, 6578*
    CELLS, CULTURED
        CELL MEMBRANE, 6135*
        CELL TRANSFORMATION, NEOPLASTIC,

  - 6135*
- CHROMOSOMES
  - IMMUNOLOGIC TECHNICS, 6579*
- COLONIC NEOPLASMS
  - AGGLUTINATION, 6384*
  - LYMPHOCYTES, 6384*
  - POLYPS, 6552
  - TISSUE EXTRACTS, 6384*
- DNA, MITOCHONDRIAL
  - ACTINOMYCIN D, 6551
  - ALANINE, 6551
  - CYSTEINE, 6551
  - DNA POLYMERASE, 6551
  - ETHANOL, 2-MERCAPTO-, 6551
  - ETHYL ALCOHOL, 6551
  - GLUTATHIONE, 6551
  - METHIONINE, 6551
  - THREITOL, 1,4-DITHIO-, 6551
- EPITHELIAL CELLS
  - REVIEW, 6029
- FIBROSARCOMA
  - VIRUS, AVIAN SARCOMA, 6322*
- HEPATOMA
  - BENZENAMINE, N,N-DIMETHYL-4-((3-METHYLPHENYL)AZO)-, 6577*
  - ZINC, 6577*
- LEUKEMIA L1210
  - FORMALDEHYDE, 6580*
  - URIDINE, 2'-DEOXY-5-FLUORO-, 6580*
- LEUKEMIA, MYELOCYTIC
  - BONE MARROW CELLS, 6542
  - CELL CYCLE KINETICS, 6542
- LUNG NEOPLASMS
  - IMMUNITY, PASSIVE, 6362
- B-LYMPHOCYTES
  - DEXTRAN SULFATE, 6368
  - LIPOPOLYSACCHARIDES, 6368
  - TUBERCULIN, 6368
- ULTRAVIOLET RAYS
  - ENDONUCLEASES, 6253*
  - RADIATION EFFECTS, HAMSTER OVARY CELLS, 6253*
- URIDINE, 5-BROMO-2'-DEOXY-
  - CELLS, CULTURED, 6579*
  - CHROMOSOMES, 6579*
- URIDINE, 2'-DEOXY-5-IODO-
  - CELLS, CULTURED, 6579*
  - CHROMOSOMES, 6579*
- VIRUS, ADENO 2
  - ENDONUCLEASES, 6310
  - ORIGIN AND DIRECTION, 6310
  - TEMPERATURE SENSITIVE MUTANTS, 6307
- VIRUS, ADENO 5
  - HOST-RANGE MUTANTS, 6339*
  - TEMPERATURE SENSITIVE MUTANTS, 6339*
  - ULTRASTRUCTURAL STUDY, 6309
- VIRUS, AVIAN MYELOBLASTOSIS
  - CATIONS, DIVALENT, 6578*
  - DNA NUCLEOTIDYLTRANSFERASES, 6578*
- VIRUS, DNA TUMOR
  - CELL TRANSFORMATION, NEOPLASTIC, REVIEW, 6087*
- VIRUS, EPSTEIN-BARR
  - SUPERINFECTION, RAJI CELLS, 6311
- VIRUS, HERPES SIMPLEX 2
  - ZINC SULFATE, 6316
- VIRUS, SV40
  - ULTRAVIOLET RAYS, 6262*
  - HYBRID CELLS, 6338*
  - ULTRAVIOLET RAYS, 6262*

- DNA, SINGLE STRANDED
  - DIMETHYLAMINE, N-NITROSO-
    - LIVER, RAT, 6170*
  - LEUKEMIA, MYELOBLASTIC
    - ANTIBODIES, 6382*
  - LEUKEMIA, MYELOCYTIC
    - ANTIBODIES, 6382*
  - LYMPHOMA
    - ANTIBODIES, 6382*
  - RADIATION, IONIZING
    - DNA REPAIR, 6251*

- DNA, VIRAL
  - BURKITT'S LYMPHOMA
    - VIRUS, EPSTEIN-BARR, 6341*
  - ONCOGENIC VIRUSES
    - REVIEW, 6084*
  - ULTRAVIOLET RAYS
    - VIRUS REPLICATION, 6262*
  - VIRUS, ADENO 2
    - GENOME MAPPING, REVIEW, 6080*
    - TEMPERATURE SENSITIVE MUTANTS, 6307
  - VIRUS, ADENO 5
    - GENOME MAPPING, REVIEW, 6080*
    - ULTRASTRUCTURAL STUDY, 6309
  - VIRUS, AVIAN SARCOMA
    - ISOLATION AND CHARACTERIZATION, 6322*
  - VIRUS, C-TYPE MURINE
    - VIRUS REPLICATION, 6290
  - VIRUS, EPSTEIN-BARR
    - DNA-DNA HYBRIDIZATION, REVIEW, 6018
  - VIRUS, HERPES SIMPLEX 1
    - ULTRASTRUCTURAL, REVIEW, 6083*
  - VIRUS, ROUS SARCOMA
    - DNA-RNA HYBRIDIZATION, 6298
    - VIRUS, DNA TUMOR, 6298
  - VIRUS, SV40
    - CLEAVAGE MAP, TEMPERATURE SENSITIVE MUTANTS, 6304
    - RNA POLYMERASE, 6301
    - ULTRAVIOLET RAYS, 6262*
    - VIRUS, RESCUE, TEMPERATURE SENSITIVE MUTANTS, 6304

- DRUG THERAPY
  - LEUKEMIA
    - NEOPLASM METASTASIS, REVIEW, 6127*
  - NEOPLASMS
    - TRANSPLANTATION, HETEROLOGOUS, 6376

- DUODENAL NEOPLASMS
  - ADENOCARCINOMA
    - FRUCTOSEDIPHOSPHATE ALDOLASE, 6559
    - GUANIDINE, 1-METHYL-3-NITRO-1-NITROSO-, 6559
  - FRUCTOSEDIPHOSPHATE ALDOLASE
    - ISOLATION AND CHARACTERIZATION, 6559
  - GUANIDINE, 1-METHYL-3-NITRO-1-NITROSO-
    - FRUCTOSEDIPHOSPHATE ALDOLASE, 6559

DUST
- NOSE NEOPLASMS
  - OCCUPATIONAL HAZARD, REVIEW, 6001

EGG PROTEINS
- VIRUS, SV40
  - CELL DIVISION, REVIEW, 6526*
  - AGGLUTINATION, REVIEW, 6526*

EHRLICH ASCITES CARCINOMA
- SEE CARCINOMA, EHRLICH TUMOR

EMOTIONS
- BREAST NEOPLASMS
  - PERSONALITY ASSESSMENT, 6499
  - PRECANCEROUS CONDITIONS, 6499

ENDOCRINE GLANDS
- BENZ(E)ACEPHENANTHRYLENE
  - TISSUE DISTRIBUTION, 6194*
- BENZO(A)PYRENE
  - TISSUE DISTRIBUTION, 6194*

ENDONUCLEASES
- DNA REPAIR
  - CELL TRANSFORMATION, NEOPLASTIC, REVIEW, 6010
- ULTRAVIOLET RAYS
  - DNA REPLICATION, 6253*
- VIRUS, ADENO 2
  - DNA REPLICATION, 6310

ENDOPLASMIC RETICULUM
- LUPUS ERYTHEMATOSUS, SYSTEMIC
  - ULTRASTRUCTURAL STUDY, 6443*

ENVIRONMENTAL HAZARD
- ARSENIC
  - CARCINOGENIC POTENTIAL, REVIEW, 6049*
- BENZO(A)PYRENE
  - VOLCANOS, 6537*
- ETHYLENE, CHLORO- POLYMER
  - CARCINOGENIC POTENTIAL, REVIEW, 6005
- MESOTHELIOMA
  - ASBESTOS, 6011
- OCCUPATIONAL HAZARD
  - REVIEW, 6054*
- PLUTONIUM OXIDE
  - DOSE-RESPONSE STUDY, REVIEW, 6074*
- ZINC
  - CARCINOGENIC POTENTIAL, 6063*

ENVIRONMENTAL POLLUTANTS
- CARCINOGEN, CHEMICAL
  - SCREENING METHODS, REVIEW, 6032*
- NEOPLASMS
  - ANIMAL MODEL, 6035*
  - REVIEW, 6035*, 6037*

ENZYMES
- CARCINOGEN, CHEMICAL
  - REVIEW, 6042*
- CARCINOGENIC METABOLITE
  - REVIEW, 6042*
- CARCINOMA 256, WALKER
  - LIVER, 6572

EOSINOPHILIC GRANULOMA
- BONE NEOPLASMS
  - CASE REPORT, MULTIFOCAL DISEASE, 6446*
  - DIAGNOSIS AND TREATMENT, 6446*

EOSINOPHILS
- NEPHRITIS, INTERSTITIAL
  - CASE REPORT, 6458*

EPENDYMOMA
- VIRUS, PAPOVA
  - ANTIGENS, NEOPLASM, 6337*

EPITHELIAL CELLS
- WATER POLLUTANTS
  - DISTRIBUTION, REVIEW, 6064*

ERYTHEMIA
- SKIN NEOPLASMS
  - ULTRAVIOLET RAYS, 6266*
- ULTRAVIOLET RAYS
  - PIGMENTATION, 6266*

ERYTHROCYTES
- ANEMIA, HEMOLYTIC, AUTOIMMUNE
  - VIRUS, FRIEND MURINE LEUKEMIA, 6330*
- LEUKEMIA, MYELOCYTIC
  - ENZYMATIC ACTIVITY, 6456*
  - GLUCOSEPHOSPHATE DEHYDROGENASE, 6456*
  - HEXOKINASE, 6456*
  - PYRUVATE KINASE, 6456*

ERYTHROLEUKEMIA
- ANTILYMPHOCYTE SERUM
  - IMMUNE RESPONSE, MOUSE, 6355
- BLOOD GROUPS
  - CASE REPORT, 6413
  - PLANT AGGLUTININS, 6413
- BONE MARROW
  - POLYPLOIDY, 6449*
- BONE MARROW CELLS
  - CHROMOSOME ABNORMALITIES, 6453*
- CHROMOSOME ABNORMALITIES
  - CASE REPORT, 6453*
  - CHROMOSOMES, HUMAN, 16-18, 6453*
  - Q-BANDING, 6415
  - TREATMENT AND PROGNOSIS, 6415
- HYBRID CELLS
  - ERYTHROPOIESIS, 6576*
  - GLOBIN, 6576*
- IMMUNITY, CELLULAR
  - ANTILYMPHOCYTE SERUM, 6355
  - T-LYMPHOCYTES, 6355
- T-LYMPHOCYTES
  - IMMUNE RESPONSE, MOUSE, 6355
- PLANT AGGLUTININS
  - CASE REPORT, 6413
- VIRUS, FRIEND MURINE LEUKEMIA
  - IMMUNE RESPONSE, MOUSE, 6355
  - IMMUNITY, CELLULAR, 6355
  - IMMUNOSUPPRESSION, 6355

ERYTHROPOIESIS
- ERYTHROLEUKEMIA
  - HYBRID CELLS, 6576*
- LEUKEMIA, MYELOBLASTIC

    - BONE MARROW CELLS, 6483*
    - SPLEEN, 6483*
  - LEUKEMIA, MYELOCYTIC
    - CASE REPORT, CHILD, 6456*
  - VIRUS, FRIEND MURINE LEUKEMIA
    - VIRUS REPLICATION, 6287

- ESCHERICHIA COLI
  - ACRYLAMIDE, 2-(2-FURYL)-3-(5-NITRO-2-FURYL)-
    - SCREENING METHOD, 6184*
  - CARCINOGEN, CHEMICAL
    - SCREENING METHOD, 6184*, 6187*
  - DIMETHYLAMINE, N-NITROSO-
    - IN VITRO PRODUCTION, 6161
    - NITRASE-POSITIVE BACTERIA, 6161
  - POLY A
    - RNA, RIBOSOMAL, 6555
  - RADIATION, IONIZING
    - DNA REPAIR, 6251*

- ESOPHAGEAL NEOPLASMS
  - ANILINE, N-METHYL-N-NITROSO-
    - ANIMAL MODEL, RAT, 6215*
    - BLEOMYCIN, 6215*
  - CARCINOMA, EPIDERMOID
    - ANILINE, N-METHYL-N-NITROSO-, 6215*
    - EPIDEMIOLOGY, BLACKS, 6504
  - ETHYL ALCOHOL
    - EPIDEMIOLOGY, BLACKS, 6504
    - EPIDEMIOLOGY, MORMONS, 6503
  - SMOKING
    - EPIDEMIOLOGY, BLACKS, 6504

- ESTERASES
  - LEUKEMIA, MONOCYTIC
    - CASE REPORT, 6408
  - LEUKEMIA, MYELOCYTIC
    - CASE REPORT, 6408
    - CELL DIFFERENTIATION, 6409

- ESTRADIOL
  - DIBUTYRYL CYCLIC AMP
    - UTERUS, MOUSE, 6568
  - RECEPTORS, HORMONE
    - MOUSE, NEWBORN, 6568

- ESTROGENS
  - UTERINE NEOPLASMS
    - REVIEW, 6068*
    - SERUM LEVELS, REVIEW, 6110*

- ESTROGENS, SYNTHETIC
  - BREAST NEOPLASMS
    - CARCINOGENIC POTENTIAL, REVIEW, 6009

- ETHANE, HEXACHLORO-
  - WATER POLLUTION
    - DISTRIBUTION, REVIEW, 6064*

- ETHANE, 1,1,1-TRICHLORO-2,2-BIS(P-CHLOROPHENYL)-
  - CELLS, CULTURED
    - RETENTION, 6216*
  - WATER POLLUTION
    - CARCINOGENIC POTENTIAL, FISH, 6524*

- ETHANE, 1,1,1-TRICHLORO-2,2-BIS(P-METHOXYPHENYL)-
  - WATER POLLUTANTS
    - DISTRIBUTION, REVIEW, 6064*

- ETHANOL, 2-MERCAPTO-
  - DNA, MITOCHONDRIAL
    - DNA REPLICATION, 6551

- ETHANOL, 2,2',2''-NITRILOTRIS-
  - CHOLANTHRENE, 3-METHYL-
    - CO-CARCINOGENIC ACTIVITY, 6155
  - GASTROINTESTINAL SYSTEM
    - CARCINOGENIC POTENTIAL, RAT, 6155
  - PAPILLOMA
    - CO-CARCINOGENIC ACTIVITY, 6155
  - SKIN NEOPLASMS
    - CARCINOGENIC POTENTIAL, RAT, 6155

- ETHER, BIS(2-CHLOROETHYL)-
  - WATER POLLUTANTS
    - DISTRIBUTION, REVIEW, 6064*

- ETHER, BIS(CHLOROMETHYL)-
  - NEOPLASMS
    - REVIEW, 6035*

- ETHIDIUM BROMIDE
  - DNA REPAIR
    - SCREENING METHODS, REVIEW, 6032*

- ETHYL ALCOHOL
  - BREAST NEOPLASMS
    - EPIDEMIOLOGY, MORMONS, 6503
  - DNA, MITOCHONDRIAL
    - DNA REPLICATION, 6551
  - ESOPHAGEAL NEOPLASMS
    - EPIDEMIOLOGY, BLACKS, 6504
    - EPIDEMIOLOGY, MORMONS, 6503
  - MELANOMA
    - EPIDEMIOLOGY, MORMONS, 6503
  - THYROID NEOPLASMS
    - EPIDEMIOLOGY, MORMONS, 6503

- ETHYLAMINE, 2,2-DICHLORO-N,N-DIMETHYL-
  - DNA
    - ALKYLATION, 6153
    - SPECTRUM ANALYSIS, 6153

- ETHYLENE, CHLORO-
  - AIR POLLUTION
    - CARCINOGENIC POTENTIAL, 6060*
  - ANGIOSARCOMA
    - AIR POLLUTION, 6060*
    - CARCINOGENIC POTENTIAL, REVIEW, 6005
  - LUNG
    - DOSE-RESPONSE STUDY, RAT, 6206*
    - METABOLISM, RAT, 6154
    - TISSUE DISTRIBUTION, RAT, 6207*
  - METABOLISM
    - DOSE-RESPONSE STUDY, 6207*
    - DOSE-RESPONSE STUDY, RAT, 6206*
  - MICROSOMES
    - MUTAGENIC ACTIVITY, 6138
  - NEOPLASMS
    - OCCUPATIONAL HAZARD, 6051*
    - REVIEW, 6035*
  - OCCUPATIONAL HAZARD

        CARCINOGENIC POTENTIAL, REVIEW, 6005
    SALMONELLA TYPHIMURIUM
        MUTAGENIC ACTIVITY, 6138
    TISSUE DISTRIBUTION
        DOSE-RESPONSE STUDY, RAT, 6154
    URINE
        CARCINOGENIC METABOLITE, 6206*
        CARCINOGENIC METABOLITE, RAT, 6207*
        DOSE-RESPONSE STUDY, RAT, 6206*
        METABOLISM, RAT, 6154
    WATER POLLUTANTS
        DISTRIBUTION, REVIEW, 6064*

ETHYLENE, CHLORO- POLYMER
    CELL TRANSFORMATION, NEOPLASTIC
        DOSE-RESPONSE STUDY, REVIEW, 6052*
    ENVIRONMENTAL HAZARD
        CARCINOGENIC POTENTIAL, REVIEW, 6005
    FOOD CONTAMINATION
        EPIDEMIOLOGY, REVIEW, 6052*
    OCCUPATIONAL HAZARD
        EPIDEMIOLOGY, REVIEW, 6052*

XOCRINE GLANDS
    BENZ(E)ACEPHENANTHRYLENE
        TISSUE DISTRIBUTION, 6194*
    BENZO(A)PYRENE
        TISSUE DISTRIBUTION, 6194*

XTRACHROMOSOMAL INHERITANCE
    PLANT TUMORS
        DNA, BACTERIAL, 6169*

YE NEOPLASMS
    MELANOMA
        CELL DIFFERENTIATION, 6405
        ULTRASTRUCTURAL STUDY, 6404, 6405
    NEOPLASMS, EMBRYONAL AND MIXED
        CELL DIFFERENTIATION, 6405
        ULTRASTRUCTURAL STUDY, 6405
    RADIATION, IONIZING
        DOSE-RESPONSE STUDY, MOUSE, 6265*

ACIAL NEOPLASMS
    CARCINOMA
        WOUNDS AND INJURIES, 6396
    CARCINOMA, EPIDERMOID
        WOUNDS AND INJURIES, 6396
    FIBROSARCOMA
        WOUNDS AND INJURIES, 6396
    NEUROFIBROMA
        WOUNDS AND INJURIES, 6396
    WOUNDS AND INJURIES
        CASE REPORT, 6396

ETAL DISEASES
    GENETICS
        CLASSIFICATION, REVIEW, 6115*
    TERATOGENS
        ANIMAL MODEL, REVIEW, 6115*
        CLASSIFICATION, REVIEW, 6115*

ETAL GLOBULINS
    HEPATOMA
        EPIDEMIOLOGY, NIGERIA, 6505
        SERUM LEVELS, 6575

        TRANSPLANTATION, HETEROLOGOUS, 6375

FIBERGLASS
    RESPIRATORY TRACT DISEASES
        EPIDEMIOLOGY, 6273*
    RESPIRATORY TRACT NEOPLASMS
        EPIDEMIOLOGY, 6273*

FIBERS
    AIR POLLUTION
        CARCINOGENIC POTENTIAL, 6061*
    ASBESTOS
        CARCINOGENIC EFFECT, 6073*
    ASBESTOSIS
        ASBESTOS, 6072*
    CARCINOGENIC EFFECT
        REVIEW, 6073*
    MESOTHELIOMA
        ASBESTOS, 6073*
    NEOPLASMS
        ASBESTOS, 6072*

FIBRINOLYSIS
    TERATOID TUMOR
        CELL DIFFERENTIATION, REVIEW, 6129*

FIBROBLASTS
    BENZ(A)ANTHRACENE, 7,12-DIMETHYL-
        CELL TRANSFORMATION, NEOPLASTIC, REVIEW, 6036*
        SURFACE PROPERTIES, REVIEW, 6036*
    BENZO(A)PYRENE
        BINDING, L CELLS, 6148
        CELL TRANSFORMATION, NEOPLASTIC, REVIEW, 6036*
        SURFACE PROPERTIES, REVIEW, 6036*
    CELL TRANSFORMATION, NEOPLASTIC
        TISSUE CULTURE, REVIEW, 6137*
    CELLS, CULTURED
        CELL DIVISION, 6543
    CHOLANTHRENE, 3-METHYL-
        CELL TRANSFORMATION, NEOPLASTIC, REVIEW, 6036*
        SURFACE PROPERTIES, REVIEW, 6036*
    CLOSTRIDIOPEPTIDASE A, 6592*
        CELL ADHESION, 6592*
        PROTEINS, 6592*
    DNA
        CARRIER PROTEINS, 6550
    HELA CELLS
        CELL FUSION, 6426
    HEPATOMA
        HYBRID CELLS, 6546
    HYBRID CELLS
        AGING, 6426
        COMPLEMENT, 6546
    PEPTIDE HYDROLASES
        AGGLUTINATION, 6593*
        CELL DIVISION, 6593*
    PRONASE
        AGGLUTINATION, 6593*
        CELL DIVISION, 6593*
    TRYPSIN
        CELL ADHESION, 6592*
        CELL DIVISION, 6593*
        CONCANAVALIN A, 6593*
        PROTEINS, 6592*

FIBROMA
- BREAST NEOPLASMS
  - GENETICS, 6422
- NEOPLASMS, CONNECTIVE TISSUE
  - GENETICS, 6422

FIBROSARCOMA
- CHOLANTHRENE, 3-METHYL-
  - ADRENAL CORTEX HORMONES, 6227*
  - IMMUNITY, ACTIVE, 6393*
  - IMMUNITY, CELLULAR, 6388*, 6393*
- EPIDEMIOLOGY
  - PARAGUAY, 6493
- FACIAL NEOPLASMS
  - WOUNDS AND INJURIES, 6396
- LYMPHOCYTES
  - IMMUNITY, CELLULAR, 6388*
- NEOPLASM TRANSPLANTATION
  - ADRENAL CORTEX HORMONES, 6227*
  - IMMUNITY, CELLULAR, 6388*
- PALATAL NEOPLASMS
  - IMMUNITY, CELLULAR, 6367
- SULFANILIC ACID
  - IMMUNITY, CELLULAR, 6393*
- VIRUS, AVIAN SARCOMA
  - DNA REPLICATION, 6322*
- VIRUS, GUINEA PIG HERPES
  - CELLULAR INCLUSIONS, 6300
  - HISTOPATHOLOGICAL STUDY, 6300
  - NEOPLASM METASTASIS, 6300

FLUORANTHENE
- TETRAHYMENA PYRIFORMIS
  - PHOTOTOXIC EFFECTS, 6147

FLUORENYL ACETAMIDE
- SEE ACETAMIDE, N-FLUOREN-2-YL-

FLUORESCEIN, 2',4',5',7'-TETRABROMO-, DISODIUM SALT
- BACILLUS SUBTILIS
  - SCREENING METHOD, 6184*

FOLIC ACID
- ANEMIA, MACROCYTIC
  - CONTRACEPTIVES, ORAL, 6152
- CERVIX NEOPLASMS
  - CONTRACEPTIVES, ORAL, 6152

FOOD
- NITROUS ACID
  - CONCENTRATION LEVEL, 6165
- PROLINE
  - CONCENTRATION LEVEL, 6165
- PROLINE, 1-NITROSO-
  - CONCENTRATION LEVEL, 6165
- PYRROLIDINE
  - CONCENTRATION LEVEL, 6165
- PYRROLIDINE, 1-NITROSO-
  - CONCENTRATION LEVEL, 6165

FOOD CONTAMINATION
- ACRYLAMIDE, 2-(2-FURYL)-3-(5-NITRO-2-FURYL)-
  - REVIEW, 6056*
- ASCORBIC ACID
  - REVIEW, 6056*
- CARCINOGEN, CHEMICAL
  - REVIEW, 6056*
- CARCINOGENIC METABOLITE
  - REVIEW, 6056*
- ETHYLENE, CHLORO- POLYMER
  - EPIDEMIOLOGY, REVIEW, 6052*
- GALLIC ACID
  - REVIEW, 6056*
- GUANIDINE, 1-METHYL-3-NITRO-1-NITROSO-
  - REVIEW, 6056*
- PHENOL, 2-METHOXY-
  - REVIEW, 6056*
- PYRROLIDINE, 1-NITROSO-
  - NITROUS ACID, 6536*

FOREIGN BODIES
- SARCOMA
  - HISTOLOGICAL STUDY, REVIEW, 6014
  - PRECANCEROUS CONDITIONS, REVIEW, 6014

FORMALDEHYDE
- LEUKEMIA L1210
  - DNA REPLICATION, 6580*

FORMAMIDINE, N'-(4-CHLORO-O-TOLYL)-N,N-DIMETHYL-
- ALDRIN
  - RETENTION, 6216*
- CELLS, CULTURED
  - RETENTION, 6216*
- DIELDRIN
  - RETENTION, 6216*
- PHOSPHOROTHIOIC ACID, O,O-DIETHYL O-(NITROPHENYL) ESTER
  - RETENTION, 6216*

FORSSMAN ANTIGEN
- SARCOMA
  - CELL MEMBRANE, 6570

FRUCTOSEDIPHOSPHATE ALDOLASE
- CELL TRANSFORMATION, NEOPLASTIC
  - SERUM LEVELS, REVIEW, 6131*
- DUODENAL NEOPLASMS
  - ADENOCARCINOMA, 6559
  - GUANIDINE, 1-METHYL-3-NITRO-1-NITROSO-, 6559
  - ISOLATION AND CHARACTERIZATION, 6559

GALACTOSIDASES
- ANGIOKERATOMA CORPORIS DIFFUSUM
  - HAIR, 6401

GALLIC ACID
- FOOD CONTAMINATION
  - REVIEW, 6056*

GANGLIONEUROMA
- THORACIC NEOPLASMS
  - NEUROFIBROMATOSIS, 6441*

GANGLIOSIDES
- HEPATOMA
  - ISOLATION AND CHARACTERIZATION, 6597*
  - MICROSOMES, 6597*
  - MITOCHONDRIA, 6597*
- SARCOMA
  - CELL MEMBRANE, 6570

- GASTROINTESTINAL NEOPLASMS
  - ADENOCARCINOMA
    - NAPHTHALENE, 6516
    - TRANSPLANTATION, HETEROLOGOUS, 6376
  - ADENOMA
    - GENETICS, 6469*
  - AFLATOXIN B1
    - FOOD CONTAMINATION, 6058*
  - AMARANTH
    - FOOD CONTAMINATION, 6058*
  - ANEMIA, APLASTIC
    - CHROMOSOME ABNORMALITIES, REVIEW, 6121*
  - ASBESTOS
    - EPIDEMIOLOGY, REVIEW, 6514
  - ATAXIA TELANGIECTASIA
    - CHROMOSOME ABNORMALITIES, REVIEW, 6121*
  - BENZENE, 4-ALLYL-1,2-(METHYLENEDIOXY)-
    - FOOD CONTAMINATION, 6058*
  - BREAST NEOPLASMS
    - EPIDEMIOLOGY, CORRELATION STUDY, 6532*
  - CARCINOGEN, CHEMICAL
    - SYNERGISM, REVIEW, 6045*
  - CARCINOMA, SCIRRHOUS
    - NAPHTHALENE, 6516
  - DIELDRIN
    - FOOD CONTAMINATION, 6058*
  - DIET
    - EPIDEMIOLOGY, REVIEW, 6059*
  - IMMUNOLOGIC TECHNICS
    - REVIEW, 6088*
  - LACTATE DEHYDROGENASE ISOENZYMES
    - DIAGNOSIS AND PROGNOSIS, 6560
  - LYMPHOCYTES
    - NUCLEOLAR TYPE, 6363
  - NAPHTHALENE
    - OCCUPATIONAL HAZARD, 6516
  - NEOPLASM METASTASIS
    - LYMPHOCYTES, 6363
  - NEOPLASM TRANSPLANTATION
    - IMMUNE RESPONSE, NEWBORN AND ADULT MOUSE, 6377
  - POLYPS
    - GENETICS, 6469*, 6471*
  - RIBONUCLEASE
    - SERUM LEVELS, 6556
  - TRANSPLANTATION, HETEROLOGOUS
    - MOUSE, NUDE, 6376
  - TRANSPLANTATION IMMUNOLOGY
    - NEOPLASM TRANSPLANTATION, 6377
  - XERODERMA PIGMENTOSUM
    - CHROMOSOME ABNORMALITIES, REVIEW, 6121*

- ASTROINTESTINAL SYSTEM
  - 1-CYCLOHEXENE-1-CARBOXYLIC ACID, 3,4,5-TRIHYDROXY-
    - METABOLISM, RAT, 6162
  - ETHANOL, 2,2',2''-NITRILOTRIS-
    - CARCINOGENIC POTENTIAL, RAT, 6155

- ENETICS
  - ANEMIA, APLASTIC
    - ABNORMALITIES, 6491
    - AGE FACTORS, 6491
    - CASE REPORT, 6420, 6491
    - CHROMOSOME ABERRATIONS, 6491
    - CHROMOSOME ABNORMALITIES, 6421
    - CHROMOSOMES, HUMAN, 16-18, 6421
    - DIAGNOSIS AND PROGNOSIS, REVIEW, 6122*
    - EPIDEMIOLOGY, 6434*
    - SEX FACTORS, 6491
  - ANTIPYRINE
    - ARYL HYDROCARBON HYDROXYLASES, 6210*
  - BREAST NEOPLASMS
    - FIBROMA, 6422
  - CHROMOSOMES, HUMAN, 21-22
    - BAND Q11/Q12, 6452*
  - COLONIC NEOPLASMS
    - POLYPS, 6470*, 6552
  - DIGESTIVE SYSTEM NEOPLASMS
    - ANEMIA, APLASTIC, 6420
  - DISGERMINOMA
    - CASE REPORT, 46, XY KARYOTYPE, 6435*
    - EPIDEMIOLOGY, REVIEW, 6113*
  - FETAL DISEASES
    - CLASSIFICATION, REVIEW, 6115*
  - GASTROINTESTINAL NEOPLASMS
    - ADENOMA, 6469*
    - POLYPS, 6469*, 6471*
  - INTESTINAL NEOPLASMS
    - POLYPS, 6468*
  - LEUKEMIA, LYMPHOBLASTIC
    - ANEMIA, APLASTIC, 6420
  - LEUKEMIA, RADIATION-INDUCED
    - EPIDEMIOLOGY, REVIEW, 6012
  - MULTIPLE MYELOMA
    - CASE REPORT, 6411
    - IMMUNOGLOBULINS, 6411
  - NEOPLASMS
    - REVIEW, 6116*
    - STATISTICAL ANALYSIS, 6425
  - NEOPLASMS, CONNECTIVE TISSUE
    - FIBROMA, 6422
  - NEOPLASMS, MULTIPLE PRIMARY
    - SOFT TISSUE TUMORS, REVIEW, 6114*
  - NEPHROBLASTOMA
    - PRECANCEROUS CONDITIONS, 6116*
  - NEUROFIBROMATOSIS
    - CASE REPORT, 6441*
  - OVARIAN NEOPLASMS
    - EPIDEMIOLOGY, REVIEW, 6113*
  - RETINOBLASTOMA
    - PRECANCEROUS CONDITIONS, 6116*
  - SARCOMA, OSTEOGENIC
    - ANEMIA, APLASTIC, 6420
  - SARCOMA, RETICULUM CELL
    - NEOPLASMS, MULTIPLE PRIMARY, 6418
  - TESTICULAR NEOPLASMS
    - EPIDEMIOLOGY, REVIEW, 6113*
  - VIRUS, MAREK'S DISEASE HERPES
    - IMMUNE RESPONSE, REVIEW, 6015
  - VIRUS, MURINE LEUKEMIA
    - HISTOCOMPATIBILITY ANTIGENS, 6292
    - IMMUNE RESPONSE, MOUSE, 6292
  - XERODERMA PIGMENTOSUM
    - DNA REPAIR, 6239

- GERM CELLS
  - RADIATION, IONIZING
    - MUTAGENIC ACTIVITY, REVIEW, 6069*

- GLIOBLASTOMA MULTIFORME
  - NEOPLASM METASTASIS
    - GROWTH, 6100*
- GLIOMA
  - BRAIN NEOPLASMS
    - UREA, ETHYL NITROSO-, 6157
  - NEOPLASM METASTASIS
    - GROWTH, 6100*
  - NERVOUS SYSTEM NEOPLASMS
    - AUTOSOME ABNORMALITIES, REVIEW, 6117*
- GLOBIN
  - ERYTHROLEUKEMIA
    - HYBRID CELLS, 6576*
  - HYBRID CELLS
    - GENES, STRUCTURAL, 6576*
  - METHANE, SULFINYLBIS-
    - HYBRID CELLS, 6576*
  - VIRUS, FRIEND MURINE LEUKEMIA
    - HYBRID CELLS, 6576*
- GLOMANGIOMA
  - LYMPHATIC NEOPLASMS
    - ULTRASTRUCTURAL STUDY, 6440*
- GLOMERULONEPHRITIS
  - LEUKEMIA, MYELOBLASTIC
    - CYCLOPHOSPHAMIDE, 6444*
- GLUCAGON
  - CARCINOMA 256, WALKER
    - GLYCOGENESIS, 6571
- GLUCONEOGENESIS
  - CARCINOMA 256, WALKER
    - ENZYMATIC ACTIVITY, 6572
    - LIVER, 6572
- GLUCOSE
  - CARCINOMA, EHRLICH TUMOR
    - GLYCOGEN, 6573
  - CARCINOMA 256, WALKER
    - SERUM LEVELS, 6571
- GLUCOSE, 2-DEOXY-
  - VIRUS, ROUS SARCOMA
    - CELL TRANSFORMATION, NEOPLASTIC, 6281
- GLUCOSEPHOSPHATASE
  - CARCINOMA 256, WALKER
    - BETAMETHASONE, 6571
- GLUCOSEPHOSPHATE DEHYDROGENASE
  - CARCINOMA, BASAL CELL
    - ENZYMATIC ACTIVITY, 6599*
  - CARCINOMA, EPIDERMOID
    - ENZYMATIC ACTIVITY, 6599*
  - HEPATOMA
    - ENZYMATIC ACTIVITY, 6562
  - KERATOACANTHOMA
    - ENZYMATIC ACTIVITY, 6599*
  - LEUKEMIA, MYELOCYTIC
    - ERYTHROCYTES, 6456*
  - SEBORRHEA
    - ENZYMATIC ACTIVITY, 6599*
  - ULTRAVIOLET RAYS
    - LIPID PEROXIDATION, SKIN, 6235
- GLUCOSEPHOSPHATE ISOMERASE
  - CELL TRANSFORMATION, NEOPLASTIC
    - SERUM LEVELS, REVIEW, 6131*
- GLUCURONIDASE
  - GENES, REGULATOR
    - MOUSE, REVIEW, 6132*
  - GENES, STRUCTURAL
    - MOUSE, REVIEW, 6132*
  - LEUKEMIA, MYELOCYTIC
    - CELL DIFFERENTIATION, 6409
- GLUTARALDEHYDE
  - ANTIGENS, HETEROGENETIC
    - ANTIBODY FORMATION, 6345
    - IMMUNITY, CELLULAR, 6345
    - T-LYMPHOCYTES, 6345
  - SMOKING
    - MACROPHAGES, 6173*
- GLUTATHIONE
  - DNA, MITOCHONDRIAL
    - DNA REPLICATION, 6551
- GLYCERALDEHYDEPHOSPHATE DEHYDROGENASE
  - CARCINOMA, BASAL CELL
    - FLUOROMETRY, 6586*
  - CARCINOMA, EPIDERMOID
    - FLUOROMETRY, 6586*
  - KERATOACANTHOMA
    - FLUOROMETRY, 6586*
  - WARTS
    - FLUOROMETRY, 6586*
- GLYCEROL
  - RADIATION, IONIZING
    - DNA, 6270*
- GLYCOGEN
  - CARCINOMA, EHRLICH TUMOR
    - GLUCOSE, 6573
  - CARCINOMA 256, WALKER
    - LIVER, 6572
- GLYCOLIPIDS
  - CELL MEMBRANE
    - CELL TRANSFORMATION, NEOPLASTIC, REVIEW, 6136*
- GLYCOLYSIS
  - INTESTINAL NEOPLASMS
    - ENZYMATIC ACTIVITY, REVIEW, 6131*
  - LEUKEMIA
    - ENZYMATIC ACTIVITY, REVIEW, 6131*
- GLYCOPROTEINS
  - CELL MEMBRANE
    - CELL TRANSFORMATION, NEOPLASTIC, 6279
    - CELL TRANSFORMATION, NEOPLASTIC, REVIEW, 6136*
  - NEOPLASMS
    - ANTIGENIC DETERMINANTS, REVIEW, 6026
  - VIRUS, ROUS SARCOMA
    - ALCOHOL OXIDOREDUCTASES, 6279
    - CELL TRANSFORMATION, NEOPLASTIC,

    - 6279
    - PERIODIC ACID, 6279
    - PEROXIDASES, 6279
    - PYRIDOXAL, 5-(DIHYDROGEN PHOSPHATE), 6279

- GLYCOSPHINGOLIPIDS
  - NEOPLASMS
    - ANTIGENIC DETERMINANTS, REVIEW, 6026

- GOITER
  - THYROID NEOPLASMS
    - EPIDEMIOLOGY, POLAND, 6502

- GOLD
  - CHROMOSOME ABERRATIONS
    - ARTHRITIS, 6166

- GONADOTROPINS
  - TESTICULAR NEOPLASMS
    - BIOCHEMICAL STUDY, REVIEW, 6111*

- GONADOTROPINS, CHORIONIC
  - UTERINE NEOPLASMS
    - SERUM LEVELS, REVIEW, 6110*

- GRAFT REJECTION
  - ALLOANTIGENS
    - RADIATION CHIMERA, 6379*
  - BONE NEOPLASMS
    - NEOPLASM METASTASIS, 6373
  - RADIATION, IONIZING
    - ALLOANTIGENS, 6379*
  - TERATOID TUMOR
    - NEOPLASM TRANSPLANTATION, 6490*

- GRAFT VS HOST REACTION
  - RADIATION, IONIZING
    - MAMMAE, 6257*
  - TRANSPLANTATION, HOMOLOGOUS
    - RADIATION EFFECTS, MAMMAE, RAT, 6257*

- GRANULOMA
  - LYMPHATIC NEOPLASMS
    - NEPHRITIS, INTERSTITIAL, 6458*
  - LYMPHOKINES
    - MACROPHAGE MEMBRANE POTENTIAL, 6370
  - NEPHRITIS, INTERSTITIAL
    - CASE REPORT, 6458*
  - SARCOIDOSIS
    - ENZYMATIC ACTIVITY, LYMPH NODES, 6417

- GRANULOSA CELL TUMOR
  - OVARIAN NEOPLASMS
    - EPIDEMIOLOGY, REVIEW, 6112*
  - TESTICULAR NEOPLASMS
    - 17-KETOSTEROIDS, REVIEW, 6111*

- GROWTH
  - BREAST NEOPLASMS
    - CELL CYCLE KINETICS, 6497
  - GLIOBLASTOMA MULTIFORME
    - NEOPLASM METASTASIS, 6100*
  - GLIOMA
    - NEOPLASM METASTASIS, 6100*
  - HEPATOMA
    - IMMUNE RESPONSE, 6366
    - LYMPHOCYTE TRANSFORMATION, 6366
  - MELANOMA
    - ADENOSINE CYCLIC 3',5' MONOPHOSPHATE, 6600*
    - ENZYMATIC ACTIVITY, 6600*
    - MELATONIN, 6545
    - MSH, 6600*
    - PINEALECTOMY, 6545

- GROWTH SUBSTANCES
  - NEOPLASMS
    - VASCULARIZATION, 6397

- GUANIDINE
  - VIRUS, SV40
    - NUCLEOPROTEINS, 6305

- GUANIDINE, 1-METHYL-3-NITRO-1-NITROSO-
  - CELLS, CULTURED
    - DNA REPAIR, 6214*
  - DUODENAL NEOPLASMS
    - ADENOCARCINOMA, 6559
    - FRUCTOSEDIPHOSPHATE ALDOLASE, 6559
  - FOOD CONTAMINATION
    - REVIEW, 6056*
  - HELA CELLS
    - DNA REPAIR, 6214*
  - STOMACH NEOPLASMS
    - ADENOCARCINOMA, 6156
    - CARCINOGENICITY, RAT, HAMSTER, DOG, 6156
    - CARCINOMA, MUCINOUS, 6156
  - TRANSFERASES
    - CELL TRANSFORMATION, NEOPLASTIC, 6338*
    - CELLS, CULTURED, 6338*

- GYNANDROBLASTOMA
  - OVARIAN NEOPLASMS
    - EPIDEMIOLOGY, REVIEW, 6112*

- GYNECOLOGIC NEOPLASMS
  - CONTRACEPTIVES, ORAL
    - CARCINOGENIC POTENTIAL, REVIEW, 6007
  - DIET
    - EPIDEMIOLOGY, REVIEW, 6059*

- HAMARTOMA
  - LIVER NEOPLASMS
    - CONTRACEPTIVES, ORAL, 6149

- HEART NEOPLASMS
  - MALIGNANT CARCINOID SYNDROME
    - CASE REPORT, 6399
    - ULTRASTRUCTURAL STUDY, 6399
  - NEOPLASMS, MULTIPLE PRIMARY
    - UREA, ETHYL NITROSO-, 6159
    - UREA, METHYL NITROSO-, 6159
  - UREA, ETHYL NITROSO-
    - HISTOLOGICAL STUDY, RAT, 6159
  - UREA, METHYL NITROSO-
    - HISTOLOGICAL STUDY, RAT, 6159

- HEAVY CHAIN DISEASE
  - LYMPHOCYTES
    - CELLULAR INCLUSIONS, 6364

  - PLASMA CELLS
    - CELLULAR INCLUSIONS, 6364

- HELA CELLS
  - ALKALINE PHOSPHATASE
    - ISOENZYMES, 6585*
  - BLASTOCYST
    - CELL TRANSFORMATION, NEOPLASTIC, 6539
  - CARTILAGE
    - MOUSE, NUDE, 6428
  - CELL DIFFERENTIATION
    - MOUSE, NUDE, 6428
  - CORTISONE
    - OSTEOGENESIS, 6428
  - FIBROBLASTS
    - CELL FUSION, 6426
  - GUANIDINE, 1-METHYL-3-NITRO-1-NITROSO-
    - DNA REPAIR, 6214*
  - HYBRID CELLS
    - CELL TRANSFORMATION, NEOPLASTIC, 6426
  - OSTEOGENESIS
    - MOUSE, NUDE, 6428
  - TRANSPLANTATION, HETEROLOGOUS
    - BLASTOCYST, 6539
    - ULTRASTRUCTURAL STUDY, 6539
  - ULTRAVIOLET RAYS
    - DNA, 6261*

- HEMANGIOBLASTOMA
  - SEE ANGIOSARCOMA

- HEMANGIOPERICYTOMA
  - INFANT
    - CASE REPORT, 6464*
    - HISTOLOGICAL STUDY, 6464*
  - SKIN NEOPLASMS
    - INFANT, 6464*

- HEMATOPOIESIS
  - LEUKEMIA, MYELOCYTIC
    - SPLEEN, REVIEW, 6126*
  - MYELOID METAPLASIA
    - SPLEEN, REVIEW, 6126*

- HEMATOPOIETIC STEM CELLS
  - LEUKEMIA, MYELOCYTIC
    - IMMUNE RESPONSE, REVIEW, 6126*
  - MYELOID METAPLASIA
    - IMMUNE RESPONSE, REVIEW, 6126*

- HEME
  - CYTOCHROME OXIDASE
    - FREE RADICALS, 6584*

- HEPATECTOMY
  - ANILINE, N,N-DIMETHYL-P-PHENYLAZO-
    - DIETHYLAMINE, N-NITROSO-, 6181*
  - HEPATOMA
    - DIETHYLAMINE, N-NITROSO-, 6181*

- HEPATOCARCINOMA
  - SEE HEPATOMA

- HEPATOMA
  - ALKALINE PHOSPHATASE
    - CELL CYCLE KINETICS, 6587*
    - ISOENZYMES, 6585*
  - ANILINE, N,N-DIMETHYL-P-PHENYLAZO-
    - HISTOLOGICAL STUDY, MOUSE, 6143
  - BENZENAMINE, N,N-DIMETHYL-4-((3-METHYLPHENYL)AZO)-
    - DNA REPLICATION, 6577*
    - ZINC, 6577*
  - BILE ACIDS AND SALTS
    - SERUM LEVELS, 6575
  - CHLOROFORM
    - CARCINOGENIC POTENTIAL, RAT, MOUSE 6211*
    - DOSE-RESPONSE STUDY, RAT, MOUSE, 6211*
  - CHOLESTEROL
    - SERUM LEVELS, 6575
  - CHROMOSOMES
    - BANDING PATTERNS, 6424
  - CONCANAVALIN A
    - LYMPHOCYTE TRANSFORMATION, 6366
  - CONTRACEPTIVES, ORAL
    - EPIDEMIOLOGY, 6066*, 6067*, 6149
    - NEOPLASM RUPTURE, CASE REPORT, 6527*
    - RISK FACTORS, 6230*, 6231*
    - SCREENING, 6067*
    - STATISTICAL ANALYSIS, 6066*
  - CYCLOHEXANE, 1,2,3,4,5,6-HEXACHLORO-, ALPHA-ISOMER
    - ULTRASTRUCTURAL STUDY, 6158
  - DEXAMETHASONE
    - CELL MEMBRANE, 6594*
    - INSULIN, 6583*
    - PEPTIDE HYDROLASES, 6594*
    - TYROSINE AMINOTRANSFERASE, 6583*, 6594*
  - DEXTRAN SULFATE
    - LYMPHOCYTE TRANSFORMATION, 6366
  - DIETARY FATS
    - HISTOLOGICAL STUDY, MOUSE, 6143
  - DIETHYLAMINE, N-NITROSO-
    - HEPATECTOMY, 6181*
    - OXIDATIVE PHOSPHORYLATION, 6181*
  - DIMETHYLAMINE, N-NITRO-
    - DOSE-RESPONSE STUDY, MOUSE AND RA 6180*
  - FETAL GLOBULINS
    - EPIDEMIOLOGY, NIGERIA, 6505
    - SERUM LEVELS, 6575
  - FIBROBLASTS
    - HYBRID CELLS, 6546
  - GANGLIOSIDES
    - ISOLATION AND CHARACTERIZATION, 6597*
  - GLUCOSEPHOSPHATE DEHYDROGENASE
    - ENZYMATIC ACTIVITY, 6562
  - GROWTH
    - IMMUNE RESPONSE, 6366
    - LYMPHOCYTE TRANSFORMATION, 6366
  - HYBRID CELLS
    - COMPLEMENT, 6546
  - INSULIN
    - TYROSINE AMINOTRANSFERASE, 6583*
  - LYSOSOMES
    - ENZYMATIC ACTIVITY, 6587*
  - MICROSOMES
    - GANGLIOSIDES, 6597*
  - MITOCHONDRIA
    - CARDIOLIPINS, 6581*
    - GANGLIOSIDES, 6597*

        PHOSPHOTRANSFERASES, 6581*
    MONOCROTALINE
        RAT, 6213*
    NEOPLASM METASTASIS
        ANIMAL MODEL, RAT, 6429
    NEOPLASM TRANSPLANTATION
        ANIMAL MODEL, RAT, 6429
        CELL DIFFERENTIATION, 6372
        IMMUNE RESPONSE, NEWBORN AND ADULT MOUSE, 6377
        KARYOTYPING, 6424
        NEOPLASM METASTASIS, 6372, 6429
    PEANUT OIL
        HISTOLOGICAL STUDY, MOUSE, 6143
    PENTOSYLTRANSFERASES
        ENZYMATIC ACTIVITY, 6562
    PEROXIDASES
        CELL CYCLE KINETICS, 6587*
    PHOSPHOTRANSFERASES
        ENZYMATIC ACTIVITY, 6562
    PLANT AGGLUTININS
        LYMPHOCYTE TRANSFORMATION, 6366
    PRECANCEROUS CONDITIONS
        FOOD ADDITIVES, 6143
        PEANUT OIL, 6143
    RADIATION, IONIZING
        CASE HISTORY, 6237
        CHROMATIN, 6267*
        DNA REPAIR, 6267*
        OXIDATIVE PHOSPHORYLATION, 6181*
        TEMPERATURE, 6267*
    M-TOLUIDINE, N,N-DIMETHYL-4-(PHENYLAZO)-
        CELL LINE, 6144
        KARYOTYPING, 6144
        ULTRASTRUCTURAL STUDY, 6144
    TRANSFERASES
        ENZYMATIC ACTIVITY, 6562
    TRANSPLANTATION, HETEROLOGOUS
        FETAL GLOBULINS, 6375
        ULTRASTRUCTURAL STUDY, 6375
    TRANSPLANTATION IMMUNOLOGY
        NEOPLASM TRANSPLANTATION, 6377
    ZINC
        DNA NUCLEOTIDYLTRANSFERASES, 6577*
        DNA REPLICATION, 6577*
        THYMIDINE KINASE, 6577*

HERNIA
    TESTICULAR NEOPLASMS
        EPIDEMIOLOGY, 6528*

HERPES ZOSTER
    LEUKEMIA, LYMPHOCYTIC
        IGM, 6354

HETEROCHROMATIN
    CARCINOMA, EHRLICH TUMOR
        CHROMOSOMES, 6481*

HETEROZYGOTE
    ANGIOKERATOMA CORPORIS DIFFUSUM
        HAIR ROOT ANALYSIS, 6401

HEXOKINASE
    LEUKEMIA, MYELOCYTIC
        ERYTHROCYTES, 6456*

HEXOSEDIPHOSPHATASE
    CARCINOMA 256, WALKER
        BETAMETHASONE, 6571
        LIVER, 6572

HISTOCOMPATIBILITY ANTIGENS
    BREAST NEOPLASMS
        REVIEW, 6093*
    CELL TRANSFORMATION, NEOPLASTIC
        REVIEW, 6093*
    CERVIX NEOPLASMS
        IMMUNE RESPONSE, REVIEW, 6028
    HODGKIN'S DISEASE
        IMMUNE RESPONSE, REVIEW, 6028
        REVIEW, 6093*
    ISOANTIGENS
        ISOLATION AND CHARACTERIZATION, 6380*
    LEUKEMIA, LYMPHOBLASTIC
        B-LYMPHOCYTES, 6383*
        REVIEW, 6093*
    LEUKEMIA, LYMPHOCYTIC
        B-LYMPHOCYTES, 6383*
    LEUKEMIA, MYELOBLASTIC
        B-LYMPHOCYTES, 6383*
    LEUKEMIA, MYELOCYTIC
        B-LYMPHOCYTES, 6383*
    B-LYMPHOCYTES
        ISOLATION AND CHARACTERIZATION, 6380*
    T-LYMPHOCYTES
        GRAFT VS HOST REACTION, REVIEW, 6096*
        IMMUNITY, CELLULAR, REVIEW, 6096*
    NEOPLASMS
        CELL MEMBRANE, 6025
        IMMUNE RESPONSE, REVIEW, 6025
    VIRUS, EPSTEIN-BARR
        CELL TRANSFORMATION, NEOPLASTIC, 6380*
    VIRUS, FRIEND MURINE LEUKEMIA
        VIRUS REPLICATION, 6331*
    VIRUS, GROSS MURINE LEUKEMIA
        IMMUNE RESPONSE, REVIEW, 6028
    VIRUS, MOLONEY MURINE LEUKEMIA
        VIRUS REPLICATION, 6331*
    VIRUS, MURINE LEUKEMIA
        AGE FACTORS, 6346
        CELL MEMBRANE, 6331*
        GENETICS, 6292
        IMMUNE RESPONSE, MOUSE, 6292
        T-LYMPHOCYTES, 6346
        PRECANCEROUS CONDITIONS, 6346
        VIRUS REPLICATION, 6331*

HODGKIN'S DISEASE
    ATAXIA TELANGIECTASIA
        CHROMOSOME ABNORMALITIES, REVIEW, 6121*
    EPIDEMIOLOGY
        AUSTRALIA, 6500
    HISTOCOMPATIBILITY ANTIGENS
        IMMUNE RESPONSE, REVIEW, 6028
        REVIEW, 6093*
    INTESTINAL NEOPLASMS
        EPIDEMIOLOGY, IRAN, 6533*
    LEUKOCYTES
        BACTERIOLYSIS, 6365
    LYMPHOCYTE DEPLETION
        IMMUNITY, CELLULAR, REVIEW, 6094*

- B-LYMPHOCYTES
  - IMMUNITY, CELLULAR, 6389*
- T-LYMPHOCYTES
  - IMMUNITY, CELLULAR, REVIEW, 6094*
- MACROPHAGES
  - BACTERIOLYSIS, 6365
  - PHAGOCYTOSIS, 6365
- MELANOMA
  - NEOPLASMS, MULTIPLE PRIMARY, 6406
- MONOCYTES
  - BACTERIOLYSIS, 6365
- NEOPLASMS
  - EPIDEMIOLOGY, CHEMISTS, 6518
- NEUTRONS
  - DNA REPAIR, SPLEEN, 6238
- RADIATION, IONIZING
  - DNA REPAIR, SPLEEN, 6238
- SPLENECTOMY
  - DIAGNOSIS AND TREATMENT, 6467*
- SPLENIC VEIN
  - NEOPLASM METASTASIS, 6467*
- THYMUS EXTRACTS
  - HEMATOPOIESIS, 6387*
  - IMMUNITY, CELLULAR, 6387*
  - IMMUNOGLOBULINS, 6387*
- ULTRAVIOLET RAYS
  - DNA REPAIR, SPLEEN, 6238

HORMONES
- ADRENAL GLAND NEOPLASMS
  - NEOPLASMS, EXPERIMENTAL, REVIEW, 6047*
- NEOPLASMS
  - MUTATION, 6116*
- OVARIAN NEOPLASMS
  - NEOPLASMS, EXPERIMENTAL, REVIEW, 6047*
- PANCREATIC NEOPLASMS
  - NEOPLASMS, EXPERIMENTAL, REVIEW, 6047*
- PARATHYROID NEOPLASMS
  - NEOPLASMS, EXPERIMENTAL, REVIEW, 6047*
- PITUITARY NEOPLASMS
  - NEOPLASMS, EXPERIMENTAL, REVIEW, 6047*
- TESTICULAR NEOPLASMS
  - NEOPLASMS, EXPERIMENTAL, REVIEW, 6047*
- THYROID NEOPLASMS
  - NEOPLASMS, EXPERIMENTAL, REVIEW, 6047*

HYALIN SUBSTANCE
- AMYLOIDOSIS
  - ULTRASTRUCTURAL STUDY, 6400
- CARCINOMA, BASAL CELL
  - ULTRASTRUCTURAL STUDY, 6400
- CARCINOMA, EPIDERMOID
  - ULTRASTRUCTURAL STUDY, 6400
- KERATITIS
  - ULTRASTRUCTURAL STUDY, 6400
- LICHEN PLANUS
  - ULTRASTRUCTURAL STUDY, 6400
- MELANOMA
  - AMYLOIDOSIS, 6400

HYBRID CELLS
- CELL TRANSFORMATION, NEOPLASTIC
  - AGING, 6426
- ERYTHROLEUKEMIA
  - ERYTHROPOIESIS, 6576*
  - GLOBIN, 6576*
- FIBROBLASTS
  - AGING, 6426
  - COMPLEMENT, 6546
- GLOBIN
  - GENES, STRUCTURAL, 6576*
- HELA CELLS
  - CELL TRANSFORMATION, NEOPLASTIC, 6426
- HEPATOMA
  - COMPLEMENT, 6546
  - FIBROBLASTS, 6546
- METHANE, SULFINYLBIS-
  - GLOBIN, 6576*
- VIRUS, DNA TUMOR
  - CELL TRANSFORMATION, NEOPLASTIC, REVIEW, 6087*
- VIRUS, EPSTEIN-BARR
  - DNA REPLICATION, REVIEW, 6081*
- VIRUS, FRIEND MURINE LEUKEMIA
  - GLOBIN, 6576*
  - RNA, MESSENGER, 6576*
- VIRUS, SV40
  - DNA REPLICATION, 6338*
  - HYPOXANTHINE PHOSPHORIBOSYLTRANSFERASE, 6338*
  - OSTEOGENESIS, 6428
  - OUABAIN RESISTANCE, 6338*

HYDATIDIFORM MOLE
- UTERINE NEOPLASMS
  - EPIDEMIOLOGY, REVIEW, 6110*

HYDRAZINE, 1,2-DIMETHYL-
- COLONIC NEOPLASMS
  - ADENOCARCINOMA, 6225*

HYDRO-LYASES
- BENZO(A)PYRENE
  - CARCINOGENIC METABOLITE, 6145
  - DIOL EPOXIDES, 6145
  - LIVER, 6199*
  - LYMPHOCYTES, 6199*

HYDROCHLORIC ACID
- BENZ(A)ANTHRACENE-5,6-DIONE, 7,12-DIMETHYL-
  - DIHYDRODIOL FORMATION, 6205*
- VIRUS, SV40
  - NUCLEOPROTEINS, 6305

HYDROGEN-ION CONCENTRATION
- SMOKING
  - BUFFERING CAPACITY, 6175*
  - CARCINOGENIC POTENTIAL, 6175*
  - RESPIRATORY SYSTEM, 6175*

HYDROXYACETYLAMINOFLUORENE
- SEE ACETOHYDROXAMIC ACID, N-FLUOREN-2
YL-

HYDROXYLAMINE, N-2-NAPHTHYL-
- 2-NAPHTHYLAMINE
  - MICROSOMES, LIVER, 6186*

HYPERBILIRUBINEMIA

- LIVER DISEASES
    - ANIMAL MODEL, REVIEW, 6046*

HYPERGAMMAGLOBULINEMIA
- VIRUS, AVIAN LEUKOSIS
    - ANTIBODY FORMATION, 6321*
    - IGG, 6321*
    - IMMUNE RESPONSE, 6321*
    - TRANSMISSION, CONGENITAL, 6321*
- VIRUS, INFLUENZA
    - ANTIBODY FORMATION, 6321*

HYPERPLASIA
- LIVER
    - PYRAZOLE-1-ACETAMIDE, 3,4,5-TRIBROMO-N,N,ALPHA-TRIMETHYL-, 6224*
- LIVER NEOPLASMS
    - CONTRACEPTIVES, ORAL, 6149
    - NEOPLASM TRANSPLANTATION, 6372
- THYMUS NEOPLASMS
    - REVIEW, CHILD, 6030

HYPERTENSION
- RESERPINE
    - PITUITARY HORMONES, 6229*
    - PROLACTIN, 6229*
    - STEROIDS, 6229*

HYPERTHYROIDISM
- PITUITARY NEOPLASMS
    - EPIDEMIOLOGY, REVIEW, 6101*

HYPOXANTHINE PHOSPHORIBOSYLTRANSFERASE
- VIRUS, SV40
    - HYBRID CELLS, 6338*

ATROGENIC DISEASE
- NEOPLASMS
    - REVIEW, 6037*

GA
- PLASMACYTOMA
    - IMMUNOGLOBULINS, HEAVY CHAIN, 6352
    - IMMUNOGLOBULINS, LIGHT CHAIN, 6352

GD
- LEUKEMIA, LYMPHOCYTIC
    - CELL DIFFERENTIATION, REVIEW, 6098*
- B-LYMPHOCYTES
    - CELL DIFFERENTIATION, REVIEW, 6098*
    - IMMUNOGENETICS, REVIEW, 6098*

GG
- HYPERGAMMAGLOBULINEMIA
    - VIRUS, AVIAN LEUKOSIS, 6321*
- NEUROBLASTOMA
    - BINDING, CLONAL VARIATION, 6347

GM
- CARCINOMA, BASAL CELL
    - SERUM LEVELS, 6354
- CARCINOMA, BRONCHOGENIC
    - NEOPLASM METASTASIS, 6354
- LEUKEMIA, LYMPHOCYTIC
    - HERPES ZOSTER, 6354
- B-LYMPHOCYTES
    - ANTIGENIC DETERMINANTS, 6480*
- T-LYMPHOCYTES
    - ANTIGENIC DETERMINANTS, 6480*
- MELANOMA
    - NEOPLASM METASTASIS, 6354
    - SERUM LEVELS, 6354
- MYCOSIS FUNGOIDES
    - SERUM LEVELS, 6354
- NEOPLASM METASTASIS
    - SERUM LEVELS, 6354
- RETICULOENDOTHELIOSIS
    - BONE MARROW CELLS, 6353
    - HAIRY CELLS, 6353
    - MACROPHAGES, 6353
- STOMACH NEOPLASMS
    - NEOPLASM METASTASIS, 6354
    - SKIN NEOPLASMS, 6354

IMIDAZOLE, N-ACETYL-
- CARCINOEMBRYONIC ANTIGEN
    - ANTIGEN-ANTIBODY REACTIONS, 6348

2-IMIDAZOLIDINETHIONE
- WATER POLLUTANTS
    - DISTRIBUTION, REVIEW, 6064*

IMMUNE SERUMS
- IMMUNITY, CELLULAR
    - REVIEW, 6092*
- LYMPHOMA
    - ANTIBODY FORMATION, 6356
    - IMMUNITY, CELLULAR, 6356
- MACROPHAGES
    - MIGRATION INHIBITORY FACTOR, 6392*
- VIRUS, BOVINE LEUKEMIA
    - ANTIBODIES, VIRAL, 6303
- VIRUS, ROUS SARCOMA
    - BLOCKING ACTIVITY, 6278

IMMUNITY, ACTIVE
- FIBROSARCOMA
    - CHOLANTHRENE, 3-METHYL-, 6393*

IMMUNITY, CELLULAR
- ANTIGEN-ANTIBODY COMPLEX
    - REVIEW, 6092*
- ANTIGENS, HETEROGENETIC
    - BENZENESULFONIC ACID, 2,4,6-TRINITRO-, 6345
    - GLUTARALDEHYDE, 6345
- ANTIGENS, NEOPLASM
    - TISSUE CULTURE, REVIEW, 6137*
- BONE NEOPLASMS
    - SARCOMA, OSTEOGENIC, 6367
- BREAST NEOPLASMS
    - LYMPHOCYTES, 6386*
- ERYTHROLEUKEMIA
    - ANTILYMPHOCYTE SERUM, 6355
    - T-LYMPHOCYTES, 6355
    - VIRUS, FRIEND MURINE LEUKEMIA, 6355
- FIBROSARCOMA
    - CHOLANTHRENE, 3-METHYL-, 6388*, 6393*
    - LYMPHOCYTES, 6388*
    - NEOPLASM TRANSPLANTATION, 6388*
    - SULFANILIC ACID, 6393*
- HODGKIN'S DISEASE
    - B-LYMPHOCYTES, 6389*

- IMMUNE SERUMS
  - REVIEW, 6092*
- IMMUNOLOGIC DEFICIENCY SYNDROMES
  - B-LYMPHOCYTES, 6389*
- INFECTIOUS MONONUCLEOSIS
  - VIRUS, EPSTEIN-BARR, 6315
- LEUKEMIA, LYMPHOBLASTIC
  - B-LYMPHOCYTES, 6389*
- LEUKEMIA, LYMPHOCYTIC
  - B-LYMPHOCYTES, 6389*
- LUNG NEOPLASMS
  - CARCINOMA, 6362
  - LYMPHOCYTES, 6362
- T-LYMPHOCYTES
  - REVIEW, 6092*
- LYMPHOMA
  - ANTIGEN-ANTIBODY COMPLEX, 6356
  - ANTIGENS, NEOPLASM, 6356
  - IMMUNE SERUMS, 6356
- MACROPHAGES
  - REVIEW, 6092*
- MAMMARY NEOPLASMS, EXPERIMENTAL
  - ADENOCARCINOMA, 6367
- MELANOMA
  - LYMPHOCYTES, 6386*
  - LYMPHOKINES, 6370
- MOLLUSCA
  - REVIEW, 6089*
- MOUTH NEOPLASMS
  - MELANOMA, 6367
- MULTIPLE MYELOMA
  - B-LYMPHOCYTES, 6389*
- NEOPLASM TRANSPLANTATION
  - ANIMAL MODEL, ASPLENIC, ATHYMIC MOUSE, 6371
- PALATAL NEOPLASMS
  - FIBROSARCOMA, 6367
- RNA
  - ANTIGENS, NEOPLASM, 6343
- SARCOMA
  - VIRUS, ROUS SARCOMA, 6278
- VIRUS, EPSTEIN-BARR
  - ANTIBODIES, VIRAL, 6313
  - ANTIGENS, VIRAL, 6313
- VIRUS, MOLONEY MURINE SARCOMA
  - ANTIGENS, NEOPLASM, 6332*
- VIRUS, ROUS SARCOMA
  - NEOPLASM REGRESSION, SPONTANEOUS, 6278

IMMUNITY, PASSIVE
- LUNG NEOPLASMS
  - DNA REPLICATION, 6362
  - PROTEINS, 6362
- RADIATION, IONIZING
  - T-LYMPHOCYTES, 6345

IMMUNOGLOBULINS
- SEE ALSO IGA/IGD/IGE/IGM
- LYMPHOCYTES
  - CELLS, CULTURED, REVIEW, 6097*
- MELANOMA
  - CELLULAR LOCALIZATION, 6391*
- MULTIPLE MYELOMA
  - GENETICS, 6411
- RETICULOENDOTHELIOSIS
  - BONE MARROW CELLS, 6353
  - HAIRY CELLS, 6353
  - MACROPHAGES, 6353

IMMUNOGLOBULINS, HEAVY CHAIN
- MYELOMA PROTEINS
  - CELL TRANSFORMATION, NEOPLASTIC, 6024
- PLASMACYTOMA
  - IGA, 6352

IMMUNOGLOBULINS, LIGHT CHAIN
- MULTIPLE MYELOMA
  - EPIDEMIOLOGY, 6349
  - LEUKEMIA, PLASMACYTIC, 6349
- MYELOMA PROTEINS
  - CELL TRANSFORMATION, NEOPLASTIC, 6024
- PLASMACYTOMA
  - BINDING, 6352
  - IGA, 6352
  - LYSINE, 6352
  - PHENOL, 2,4-DINITRO-, 6352

IMMUNOGLOBULINS, SURFACE
- IMMUNOLOGIC DEFICIENCY SYNDROMES
  - B-LYMPHOCYTES, 6389*
- LEUKEMIA, LYMPHOCYTIC
  - T-LYMPHOCYTES, 6357
- B-LYMPHOCYTES
  - ANTIGENIC DETERMINANTS, 6480*
  - CELL DIFFERENTIATION, REVIEW, 6098*
- T-LYMPHOCYTES
  - ANTIGENIC DETERMINANTS, 6480*

IMMUNOLOGIC DEFICIENCY SYNDROMES
- CELL TRANSFORMATION, NEOPLASTIC
  - IMMUNOSUPPRESSION, REVIEW, 6091*
- LEUKEMIA, RADIATION-INDUCED
  - EPIDEMIOLOGY, REVIEW, 6012
- B-LYMPHOCYTES
  - IMMUNITY, CELLULAR, 6389*
  - IMMUNOGLOBULINS, SURFACE, 6389*
  - LYMPHOCYTE DEPLETION, 6389*
- THYMUS EXTRACTS
  - HEMATOPOIESIS, 6387*
  - IMMUNITY, CELLULAR, 6387*
  - IMMUNOGLOBULINS, 6387*
- THYMUS NEOPLASMS
  - REVIEW, CHILD, 6030

IMMUNOLOGIC TECHNICS
- BREAST NEOPLASMS
  - REVIEW, 6088*
- CARCINOMA, BRONCHOGENIC
  - REVIEW, 6088*
- GASTROINTESTINAL NEOPLASMS
  - REVIEW, 6088*
- LEUKEMIA, MYELOBLASTIC
  - REVIEW, 6088*
- LUNG NEOPLASMS
  - REVIEW, 6088*

IMMUNOSUPPRESSION
- ERYTHROLEUKEMIA
  - VIRUS, FRIEND MURINE LEUKEMIA, 6355
- MAMMARY NEOPLASMS, EXPERIMENTAL
  - NEOPLASM TRANSPLANTATION, 6374
- NEOPLASM TRANSPLANTATION
  - ANIMAL MODEL, ASPLENIC, ATHYMIC MOUSE, 6371

- IMMUNOSUPPRESSIVE AGENTS
  - AUTOIMMUNE DISEASES
    - IMMUNE RESPONSE, REVIEW, 6090*
  - TRANSPLANTATION, HOMOLOGOUS
    - IMMUNE RESPONSE, REVIEW, 6090*

- INDOLE-3-ACETIC ACID
  - PEROXIDASES
    - RNA, BINDING, 6177*

- INFECTIOUS MONONUCLEOSIS
  - CELLS, CULTURED
    - LYMPHOCYTE TRANSFORMATION, 6361
  - VIRUS, EPSTEIN-BARR
    - ANTIGEN-ANTIBODY REACTIONS, 6315
    - IMMUNITY, CELLULAR, 6315

- INSULIN
  - HEPATOMA
    - DEXAMETHASONE, 6583*
    - TYROSINE AMINOTRANSFERASE, 6583*
  - LEUKEMIA, LYMPHOBLASTIC
    - BINDING, 6564
    - LYMPHOCYTE DEPLETION, 6564
    - T-LYMPHOCYTES, 6564

- INTERFERON
  - ONCOGENIC VIRUSES
    - ISOLATION AND CHARACTERIZATION, MOUSE, 6079*
  - VIRUS, C-TYPE RNA TUMOR
    - ANTIGENS, VIRAL, 6296
    - VIRUS REPLICATION, 6296

- INTESTINAL NEOPLASMS
  - GLYCOLYSIS
    - ENZYMATIC ACTIVITY, REVIEW, 6131*
  - HODGKIN'S DISEASE
    - EPIDEMIOLOGY, IRAN, 6533*
  - LYMPHOMA
    - EPIDEMIOLOGY, IRAN, 6533*
  - LYMPHOSARCOMA
    - EPIDEMIOLOGY, IRAN, 6533*
  - MELANOMA
    - NEOPLASMS, MULTIPLE PRIMARY, 6406
  - POLYPS
    - GENETICS, 6468*
    - SURGERY, OPERATIVE, 6468*
  - SARCOMA, RETICULUM CELL
    - EPIDEMIOLOGY, IRAN, 6533*
  - SEX FACTORS
    - EPIDEMIOLOGY, EAST BERLIN, 6507
  - TURNER'S SYNDROME
    - CASE REPORT, 6442*

- IODINE
  - BREAST NEOPLASMS
    - DIET, 6535*
    - EPIDEMIOLOGY, 6535*
  - VIRUS, POLIO
    - VIRAL PROTEINS, 6336*
  - VIRUS, RHINO 2
    - VIRAL PROTEINS, 6336*

- IODOPROTEINS
  - CELL MEMBRANE
    - PEROXIDASES, 6134*

- IRON
  - NEOPLASMS, CONNECTIVE TISSUE
    - SARCOMA, 6164
  - SARCOMA
    - CASE REPORT, 6164

- IRON HYDROXIDE
  - PROMETHIUM
    - LUNG CLEARANCE, MOUSE, 6232

- ISLET CELL TUMOR
  - PANCREATIC NEOPLASMS
    - CELLULAR INCLUSIONS, 6479*

- ISOANTIGENS
  - BLOOD GROUPS
    - ISOLATION AND CHARACTERIZATION, BRAIN TISSUE, 6344
  - BRAIN NEOPLASMS
    - BLOOD GROUPS, 6344
  - HISTOCOMPATIBILITY ANTIGENS
    - ISOLATION AND CHARACTERIZATION, 6380*
  - LYMPHOCYTES
    - CELLS, CULTURED, REVIEW, 6097*
  - T-LYMPHOCYTES
    - GRAFT VS HOST REACTION, REVIEW, 6096*
    - IMMUNITY, CELLULAR, REVIEW, 6096*
    - LEUKOCYTE CULTURE TEST, MIXED, 6361
  - UTERINE NEOPLASMS
    - BLOOD GROUPS, 6344
  - VIRUS, MURINE LEUKEMIA
    - AGE FACTORS, 6346
    - T-LYMPHOCYTES, 6346
    - PRECANCEROUS CONDITIONS, 6346

- ISOENZYMES
  - HELA CELLS
    - ALKALINE PHOSPHATASE, 6585*
  - HEPATOMA
    - ALKALINE PHOSPHATASE, 6585*
  - UTERINE NEOPLASMS
    - ISOLATION AND CHARACTERIZATION, REVIEW, 6110*

- ISOMERASES
  - CARCINOMA, BASAL CELL
    - ENZYMATIC ACTIVITY, 6599*
  - CARCINOMA, EPIDERMOID
    - ENZYMATIC ACTIVITY, 6599*
  - KERATOACANTHOMA
    - ENZYMATIC ACTIVITY, 6599*
  - SEBORRHEA
    - ENZYMATIC ACTIVITY, 6599*

- KARYOTYPING
  - HEPATOMA
    - BENZENAMINE, N,N-3-TRIMETHYL-4-(PHENYLAZO)-, 6144
    - NEOPLASM TRANSPLANTATION, 6424
  - LEUKEMIA, MYELOCYTIC
    - NEOPLASM TRANSPLANTATION, 6484*
  - MELANOMA
    - CELL LINE, AMELANOTIC, 6482*
  - PLASMACYTOMA
    - G-BANDING, 6423
  - VIRUS, DNA TUMOR
    - CELL TRANSFORMATION, NEOPLASTIC,

    - REVIEW, 6087*

- KERACYANIN
  - L CELLS
    - ULTRAVIOLET RAYS, 6260*
  - ULTRAVIOLET RAYS
    - CELL CYCLE KINETICS, 6260*

- KERATITIS
  - HYALIN SUBSTANCE
    - ULTRASTRUCTURAL STUDY, 6400

- KERATOACANTHOMA
  - GLUCOSEPHOSPHATE DEHYDROGENASE
    - ENZYMATIC ACTIVITY, 6599*
  - GLYCERALDEHYDEPHOSPHATE DEHYDROGENASE
    - FLUOROMETRY, 6586*
  - ISOMERASES
    - ENZYMATIC ACTIVITY, 6599*
  - PHOSPHOGLUCONATE DEHYDROGENASE
    - ENZYMATIC ACTIVITY, 6599*
  - PHOSPHOGLYCERATE KINASE
    - FLUOROMETRY, 6586*
  - PHOSPHOGLYCEROMUTASE
    - FLUOROMETRY, 6586*
  - PHOSPHOPYRUVATE HYDRATASE
    - FLUOROMETRY, 6586*
  - PYRUVATE KINASE
    - FLUOROMETRY, 6586*
  - TRANSFERASES
    - ENZYMATIC ACTIVITY, 6599*

- KIDNEY
  - DIETHYLAMINE, N-NITROSO-
    - DNA, ALKYLATION, 6178*
  - DIMETHYLAMINE, N-NITROSO-
    - DNA, ALKYLATION, 6178*
  - TERATOID TUMOR
    - CELL DIFFERENTIATION, 6487*

- KIDNEY NEOPLASMS
  - ADENOCARCINOMA
    - DIMETHYLAMINE, N-NITRO-, 6180*
  - CHLOROFORM
    - CARCINOGENIC POTENTIAL, RAT, MOUSE, 6211*
    - DOSE-RESPONSE STUDY, RAT, MOUSE, 6211*
  - DIMETHYLAMINE, N-NITRO-
    - DOSE-RESPONSE STUDY, MOUSE AND RAT, 6180*
  - DIPROPYLAMINE, N-NITROSO-
    - CARCINOGENIC METABOLITE, 6163

- KLEBSIELLA
  - DIMETHYLAMINE, N-NITROSO-
    - IN VITRO PRODUCTION, 6161
    - NITRASE-POSITIVE BACTERIA, 6161

- KRYPTON
  - RADIOISOTOPES
    - DOSE-RESPONSE STUDY, GUINEA PIG, RAT, HAMSTER, 6243*

- L CELLS
  - BENZO(A)PYRENE
    - METABOLISM, 6148
  - OXIDATIVE PHOSPHORYLATION
    - UNCOUPLING AGENTS, 6188*
  - PHENOL, 2,4-DINITRO-
    - GRANULE DEPOSITION, 6188*
  - ULTRAVIOLET RAYS
    - KERACYANIN, 6260*
    - RADIO-PROTECTIVE AGENTS, 6260*

- LACTATE DEHYDROGENASE
  - CELL TRANSFORMATION, NEOPLASTIC
    - SERUM LEVELS, REVIEW, 6131*
  - LUNG NEOPLASMS
    - NEOPLASM METASTASIS, 6430, 6561
  - MAMMARY NEOPLASMS, EXPERIMENTAL
    - NEOPLASM METASTASIS, 6430, 6561

- LACTATE DEHYDROGENASE ISOENZYMES
  - COLONIC NEOPLASMS
    - ADENOCARCINOMA, 6560
    - METAPLASIA, 6560
    - TISSUE LEVELS, 6560
  - GASTROINTESTINAL NEOPLASMS
    - DIAGNOSIS AND PROGNOSIS, 6560
  - STOMACH NEOPLASMS
    - ADENOCARCINOMA, 6560
    - METAPLASIA, 6560
    - TISSUE LEVELS, 6560

- LARYNGEAL NEOPLASMS
  - CARCINOMA
    - NAPHTHALENE, 6516
  - CARCINOMA, EPIDERMOID
    - NAPHTHALENE, 6516
  - DIETHYLAMINE, N-NITROSO-
    - SMOKING, 6179*
  - NAPHTHALENE
    - OCCUPATIONAL HAZARD, 6516
  - PAPILLOMA
    - DIETHYLAMINE, N-NITROSO-, 6179*

- LARYNGECTOMY
  - CARCINOMA
    - REVIEW, 6099*

- LASERS
  - CELL TRANSFORMATION, NEOPLASTIC
    - PHOTONS, ABSORPTION AND REEMISSI 6269*
  - NUCLEIC ACIDS
    - HYDROGEN BONDS, 6269*

- LEIOMYOMA
  - UTERINE NEOPLASMS
    - CASE REPORT, 6476*

- LEUCINE
  - VIRUS, MOLONEY MURINE LEUKEMIA
    - VIRAL PROTEINS, 6333*

- LEUKEMIA
  - AMINO ACYL T RNA SYNTHETASES
    - ENZYMATIC ACTIVITY, LEUKOCYTES, 6582*
  - ANEMIA, APLASTIC
    - CHROMOSOME ABNORMALITIES, REVIE 6121*
    - EPIDEMIOLOGY, REVIEW, 6122*
  - ATOMIC ENERGY
    - DOSE-RESPONSE STUDY, REVIEW, 65
  - BLOOD-BRAIN BARRIER
    - NEOPLASM METASTASIS, REVIEW, 61

- CELL MEMBRANE
  - VISCOSITY, REVIEW, 6595*
- CENTRAL NERVOUS SYSTEM
  - NEOPLASM METASTASIS, REVIEW, 6127*
- CHROMOSOME ABNORMALITIES
  - REVIEW, 6119*
- DRUG THERAPY
  - NEOPLASM METASTASIS, REVIEW, 6127*
- GASTROINTESTINAL NEOPLASMS
  - CHROMOSOME ABNORMALITIES, REVIEW, 6121*
- GLYCOLYSIS
  - ENZYMATIC ACTIVITY, REVIEW, 6131*
- INCIDENCE RATES
  - EPIDEMIOLOGY, INDIA, 6511
  - EPIDEMIOLOGY, POLAND, 6492
- LIPIDS
  - VISCOSITY, REVIEW, 6595*
- MELANOMA
  - NEOPLASMS, MULTIPLE PRIMARY, 6406
- METHYLTRANSFERASES
  - ENZYMATIC ACTIVITY, LEUKOCYTES, 6582*
- NERVOUS SYSTEM NEOPLASMS
  - CHILD, REVIEW, 6127*
  - NEOPLASM METASTASIS, REVIEW, 6127*
- POLYPLOIDY
  - PRECANCEROUS CONDITIONS, 6449*
- THYMUS EXTRACTS
  - HEMATOPOIESIS, 6387*
  - IMMUNITY, CELLULAR, 6387*
  - IMMUNOGLOBULINS, 6387*
- TRANSPLANTATION, HETEROLOGOUS
  - MOUSE, NUDE, 6376
- VIRUS, C-TYPE
  - ANTIGENS, VIRAL, 6295
  - EPIDEMIOLOGY, MOUSE, 6295
- VIRUS, FELINE LEUKEMIA
  - ANTIGEN-ANTIBODY REACTIONS, 6329*
- VIRUS, JM-V HERPES
  - CHROMOSOME ABERRATIONS, 6324*
- XERODERMA PIGMENTOSUM
  - CHROMOSOME ABNORMALITIES, REVIEW, 6121*

LEUKEMIA, ACUTE LYMPHOCYTIC
- SEE LEUKEMIA, LYMPHOBLASTIC

LEUKEMIA L1210
- FORMALDEHYDE
  - DNA REPLICATION, 6580*
- URIDINE, 2'-DEOXY-5-FLUORO-
  - DNA REPLICATION, 6580*

LEUKEMIA, LYMPHOBLASTIC
- ANEMIA, APLASTIC
  - GENETICS, 6420
- CELL MEMBRANE
  - T-LYMPHOCYTES, 6125*
- CELLULAR INCLUSIONS
  - CASE REPORT, 6455*
  - ULTRASTRUCTURAL STUDY, 6455*
- HISTOCOMPATIBILITY ANTIGENS
  - REVIEW, 6093*
- INSULIN
  - BINDING, 6564
- LYMPHOCYTE DEPLETION
  - INSULIN, 6564
- B-LYMPHOCYTES
  - HISTOCOMPATIBILITY ANTIGENS, 6383*
  - IMMUNITY, CELLULAR, 6389*
- T-LYMPHOCYTES
  - INSULIN, 6564
  - ROSETTE FORMATION, 6125*
- VIRUS, GROSS MURINE LEUKEMIA
  - TISSUE DISTRIBUTION, 6285
- VIRUS-LIKE PARTICLES
  - ULTRASTRUCTURAL STUDY, 6455*

LEUKEMIA, LYMPHOCYTIC
- ADENYL CYCLASE
  - CELL DIFFERENTIATION, 6596*
- ALPHA-AMANITINE
  - RNA POLYMERASE, 6557
- CELL DIFFERENTIATION
  - FLUORESCENCE PROBE, 6596*
- CELL MEMBRANE
  - ANTIGENS, 6385*
- HERPES ZOSTER
  - IGM, 6354
- IGD
  - CELL DIFFERENTIATION, REVIEW, 6098*
- INCIDENCE RATES
  - EPIDEMIOLOGY, POLAND, 6492
- LEUKOCYTES
  - LIPIDS, 6569
  - SPHINGOMYELINS, 6569
  - TRIGLYCERIDES, 6569
- LYMPHOCYTES
  - CHROMOSOME ABERRATIONS, 6358, 6390*
  - CLASSIFICATION AND PROGNOSIS, 6448*
  - IMMUNE RESPONSE, 6358
  - SEQUENTIAL ANALYSIS, 6359
  - ULTRASTRUCTURAL STUDY, 6448*
- B-LYMPHOCYTES
  - ANTIGEN-ANTIBODY REACTIONS, 6385*
  - HISTOCOMPATIBILITY ANTIGENS, 6383*
  - IMMUNITY, CELLULAR, 6389*
  - ROSETTE FORMATION, 6448*
- T-LYMPHOCYTES
  - IMMUNE RESPONSE, REVIEW, 6094*
  - IMMUNOGLOBULINS, SURFACE, 6357
  - ROSETTE FORMATION, 6448*
- RIFAMYCIN
  - RNA POLYMERASE, 6557
- RNA POLYMERASE
  - ISOLATION AND CHARACTERIZATION, 6557
- RNA, RIBOSOMAL
  - CELL DIFFERENTIATION, 6596*

LEUKEMIA, MONOCYTIC
- ESTERASES
  - CASE REPORT, 6408

LEUKEMIA, MYELOBLASTIC
- BLOOD GROUPS
  - CASE REPORT, 6412
  - PLANT AGGLUTININS, 6412
- BONE MARROW
  - POLYPLOIDY, 6449*
- BONE MARROW CELLS
  - ERYTHROPOIESIS, 6483*
- CELL DIFFERENTIATION
  - CASE REPORT, REMISSION, 6410

    CELL TRANSFORMATION, NEOPLASTIC, 6483*
  CHROMOSOME ABNORMALITIES
    Q-BANDING, 6415
    TREATMENT AND PROGNOSIS, 6415
  CYCLOPHOSPHAMIDE
    CASE REPORT, 6444*
    GLOMERULONEPHRITIS, 6444*
  DNA, SINGLE STRANDED
    ANTIBODIES, 6382*
  IMMUNOLOGIC TECHNICS
    REVIEW, 6088*
  B-LYMPHOCYTES
    HISTOCOMPATIBILITY ANTIGENS, 6383*
  MONOCROTALINE
    RAT, 6213*
  NEUTROPHILS
    CELL DIFFERENTIATION, 6563
    PEROXIDASES, 6563
    ULTRASTRUCTURAL STUDY, 6563
  PEROXIDASES
    AZUROPHILS, 6563
  PLANT AGGLUTININS
    CASE REPORT, 6412
  SPLEEN
    ERYTHROPOIESIS, 6483*

LEUKEMIA, MYELOCYTIC
  ACID PHOSPHATASE
    CELL DIFFERENTIATION, 6409
  ALKALINE PHOSPHATASE
    DIAGNOSIS AND TREATMENT, REVIEW, 6128*
  AMINOPEPTIDASES
    CELL DIFFERENTIATION, 6409
  BLOOD PLATELETS
    ULTRASTRUCTURAL STUDY, 6457*
  BONE MARROW
    POLYPLOIDY, 6449*
  BONE MARROW CELLS
    CELL DIVISION, 6542
    DNA REPLICATION, 6542
    ULTRASTRUCTURAL STUDY, 6457*
  CELL DIFFERENTIATION
    DIAGNOSIS AND TREATMENT, REVIEW, 6128*
  CHROMOSOME ABERRATIONS
    CASE REPORT, 6414, 6419
    CHROMOSOMES, HUMAN, 1-3, 6414
    CHROMOSOMES, HUMAN, 16-18, 6415
    CHROMOSOMES, HUMAN, 21-22, 6414
    PLANT AGGLUTININS, 6419
  CHROMOSOME ABNORMALITIES
    Q-BANDING, 6415
    TREATMENT AND PROGNOSIS, 6415
  CHROMOSOMES, HUMAN, 21-22
    BAND 22Q12, 6452*
    CASE REPORT, TRANSLOCATION, 6451*
    CELL DIFFERENTIATION, 6409
    DIAGNOSIS AND TREATMENT, REVIEW, 6128*
  DNA, NEOPLASM
    TRANSPLANTATION, HOMOLOGOUS, 6299
  DNA REPLICATION
    CELL CYCLE KINETICS, 6542
  DNA, SINGLE STRANDED
    ANTIBODIES, 6382*
  ERYTHROCYTES
    ENZYMATIC ACTIVITY, 6456*
    GLUCOSEPHOSPHATE DEHYDROGENASE, 6456*
    HEXOKINASE, 6456*
    PYRUVATE KINASE, 6456*
  ERYTHROPOIESIS
    CASE REPORT, CHILD, 6456*
  ESTERASES
    CASE REPORT, 6408
    CELL DIFFERENTIATION, 6409
  GLUCURONIDASE
    CELL DIFFERENTIATION, 6409
  HEMATOPOIESIS
    SPLEEN, REVIEW, 6126*
  HEMATOPOIETIC STEM CELLS
    IMMUNE RESPONSE, REVIEW, 6126*
  INCIDENCE RATES
    EPIDEMIOLOGY, POLAND, 6492
  B-LYMPHOCYTES
    HISTOCOMPATIBILITY ANTIGENS, 6383
  MEGAKARYOCYTES
    ULTRASTRUCTURAL STUDY, 6457*
  NEOPLASM TRANSPLANTATION
    CELL DIFFERENTIATION, 6484*
    KARYOTYPING, 6484*
  NEUTROPHILS
    ULTRASTRUCTURAL STUDY, 6457*
  PRECANCEROUS CONDITIONS
    CASE REPORT, 6419
  RADIATION, IONIZING
    SPLEEN, REVIEW, 6126*
  UREA, 1-BUTYL-1-NITROSO-
    NEOPLASM TRANSPLANTATION, 6484*
  VITAMIN B12
    DIAGNOSIS AND TREATMENT, REVIEW, 6128*

LEUKEMIA, MYELOMONOCYTIC
  CATS
    C-TYPE PARTICLES, 6473*
    CASE REPORT, 6473*

LEUKEMIA, PLASMACYTIC
  MULTIPLE MYELOMA
    EPIDEMIOLOGY, 6349
    IMMUNOGLOBULINS, LIGHT CHAIN, 63

LEUKEMIA, RADIATION-INDUCED
  CHROMOSOME ABNORMALITIES
    EPIDEMIOLOGY, REVIEW, 6012
  GENETICS
    EPIDEMIOLOGY, REVIEW, 6012
  IMMUNOLOGIC DEFICIENCY SYNDROMES
    EPIDEMIOLOGY, REVIEW, 6012
  POLYCYTHEMIA VERA
    EPIDEMIOLOGY, REVIEW, 6012
  RADIOTHERAPY
    DOSE-RESPONSE STUDY, REVIEW, 607

LEUKOCYTE CULTURE TEST, MIXED
  T-LYMPHOCYTES
    ISOANTIGENS, 6361
  MELANOMA
    BREAST NEOPLASMS, 6386*

LEUKOCYTES
  HODGKIN'S DISEASE
    BACTERIOLYSIS, 6365
  LEUKEMIA, LYMPHOCYTIC
    LIPIDS, 6569

    - SPHINGOMYELINS, 6569
    - TRIGLYCERIDES, 6569
  - RADIATION, IONIZING
    - CHROMOSOME ABERRATIONS, 6252*
  - VIRUS, EPSTEIN-BARR
    - CELL TRANSFORMATION, NEOPLASTIC, 6314
    - TONSIL, 6314

- LEUKOPLAKIA
  - ANUS NEOPLASMS
    - CASE REPORT, 6472*
    - DIAGNOSIS AND PROGNOSIS, 6472*
  - MOUTH NEOPLASMS
    - PRECANCEROUS CONDITIONS, 6124*
    - REVIEW, 6124*

- EUROCRISTINE
  - MICROTUBULES
    - RADIATION EFFECTS, HAIR FOLLICLES, MOUSE, 6258*
  - RADIATION, IONIZING
    - MICROTUBULES, 6258*

- EYDIG CELL TUMOR
  - OVARIAN NEOPLASMS
    - EPIDEMIOLOGY, REVIEW, 6112*
  - TESTICULAR NEOPLASMS
    - 17-KETOSTEROIDS, REVIEW, 6111*

- H
  - PROLACTIN
    - DIETARY FATS, 6228*

- ICHEN PLANUS
  - HYALIN SUBSTANCE
    - ULTRASTRUCTURAL STUDY, 6400

- IGHT
  - VIRUS, HERPES
    - DNA REPAIR, REVIEW, 6020

- IPIDS
  - LEUKEMIA
    - VISCOSITY, REVIEW, 6595*
  - LEUKEMIA, LYMPHOCYTIC
    - LEUKOCYTES, 6569

- IPOMA
  - NECK NEOPLASMS
    - CASE REPORT, 6465*

- IPOMATOSIS
  - UTERINE NEOPLASMS
    - NEOPLASMS, MULTIPLE PRIMARY, 6476*

- IPOPOLYSACCHARIDES
  - B-LYMPHOCYTES
    - CELL DIFFERENTIATION, 6368
    - DNA REPLICATION, 6368
    - IMMUNE RESPONSE, AKR MICE, 6360
  - T-LYMPHOCYTES
    - IMMUNE RESPONSE, AKR MICE, 6360

- POSARCOMA
  - EPIDEMIOLOGY
    - PARAGUAY, 6493
  - NEOPLASM TRANSPLANTATION
    - C-TYPE PARTICLES, 6302

- LIVER
  - ACETAMIDE, THIO-
    - PHOSPHOLIPIDS, 6183*
  - ACETOHYDROXAMIC ACID, N-FLUOREN-2-YL-
    - CARCINOGENIC METABOLITE, 6226
    - METABOLISM, FAT, 6226*
  - BENZENE, (EPOXYETHYL)-
    - METABOLISM, 6196*
  - BENZO(A)PYRENE
    - HYDRO-LYASES, 6199*
    - METABOLISM, 6196*
    - OXIDOREDUCTASES, 6199*
    - TRANSFERASES, 6199*
  - BENZOXAZOLE, 2-AMINO-5-CHLORO-
    - METABOLISM, 6196*
  - CARCINOMA 256, WALKER
    - AMINOTRANSFERASES, 6572
    - GLUCONEOGENESIS, 6572
    - GLYCOGEN, 6572
    - HEXOSEDIPHOSPHATASE, 6572
    - PHOSPHORYLASES, 6572
  - COUMARIN, 7-ETHOXY-
    - METABOLISM, 6196*
  - DIETHYLAMINE, N-NITROSO-
    - DNA, ALKYLATION, 6178*
  - DIMETHYLAMINE, N-NITROSO-
    - DNA, ALKYLATION, 6178*
  - HYPERPLASIA
    - PYRAZOLE-1-ACETAMIDE, 3,4,5-TRIBROMO-N,N,ALPHA-TRIMETHYL-, 6224*
  - NEOPLASMS, EXPERIMENTAL
    - RNA, 6553, 6554
  - PHENANTHRENE, 9,10-EPOXY-9,10-DIHYDRO-
    - METABOLISM, 6196*

- LIVER DISEASES
  - BILE PIGMENTS
    - ANIMAL MODEL, REVIEW, 6046*
  - CHOLESTASIS
    - ANIMAL MODEL, REVIEW, 6046*
  - HYPERBILIRUBINEMIA
    - ANIMAL MODEL, REVIEW, 6046*

- LIVER NEOPLASMS
  - SEE ALSO HEPATOMA
  - ADENOMA
    - CASE REPORT, 6151
    - CONTRACEPTIVES, ORAL, 6151
    - DIAGNOSIS AND CLASSIFICATION, 6151
  - AFLATOXIN B1
    - HISTOLOGICAL STUDY, 6140
  - ALCOHOL DRINKING
    - EPIDEMIOLOGY, 6534*
    - STATISTICAL ANALYSIS, 6534*
  - CONTRACEPTIVES, ORAL
    - CASE REPORT, 6151
    - EPIDEMIOLOGY, 6149
  - CYCLOHEXANE, 1,2,3,4,5,6-HEXACHLORO-, ALPHA-ISOMER
    - NEOPLASM REGRESSION, SPONTANEOUS, 6158
    - PRECANCEROUS CONDITIONS, 6158
  - DIETHYLAMINE, N-NITROSO-
    - SMOKING, 6179*
  - DIPROPYLAMINE, N-NITROSO-
    - CARCINOGENIC METABOLITE, 6163
  - HAMARTOMA
    - CONTRACEPTIVES, ORAL, 6149

- HYPERPLASIA
  - CONTRACEPTIVES, ORAL, 6149
  - NEOPLASM TRANSPLANTATION, 6372
- NASOPHARYNGEAL NEOPLASMS
  - DIETHYLAMINE, N-NITROSO-, 6160
- NECROSIS
  - AFLATOXIN B1, 6140
- PYRROLIZIDINE ALKALOIDS
  - ANIMAL MODEL, REVIEW, 6046*

LUNG
- ALPHA PARTICLES
  - CARCINOGENIC POTENTIAL, REVIEW, 6074*
- BENZO(A)PYRENE
  - TISSUE DISTRIBUTION, 6194*
- ETHYLENE, CHLORO-
  - DOSE-RESPONSE STUDY, RAT, 6206*
  - METABOLISM, RAT, 6154
- RADIATION, IONIZING
  - RISK BENEFIT STUDY, REVIEW, 6013

LUNG NEOPLASMS
- ADENOCARCINOMA
  - MONOCROTALINE, 6213*
- ANXIETY
  - PERSONALITY DISORDERS, 6531*
- ASBESTOS
  - AUTOANTIBODIES, 6517
  - CLINICOPATHOLOGIC STUDY, REVIEW, 6050*
  - EPIDEMIOLOGY, 6517
  - EPIDEMIOLOGY, REVIEW, 6050*, 6514
- CARCINOMA
  - IMMUNITY, CELLULAR, 6362
- CARCINOMA, BRONCHOGENIC
  - ASBESTOS, 6517
  - AUTOANTIBODIES, 6517
- CELL ADHESION
  - NEOPLASM METASTASIS, REVIEW, 6431
- IMMUNITY, PASSIVE
  - DNA REPLICATION, 6362
  - PROTEINS, 6362
- IMMUNOLOGIC TECHNICS
  - REVIEW, 6088*
- LACTATE DEHYDROGENASE
  - NEOPLASM METASTASIS, 6430, 6561
- LYMPHOCYTES
  - IMMUNITY, CELLULAR, 6362
  - NUCLEOLAR TYPE, 6363
- MELANOMA
  - NEOPLASM METASTASIS, REVIEW, 6431
- MENINGES
  - NEOPLASM METASTASIS, 6460*
- MESOTHELIOMA
  - ASBESTOS, 6011, 6517
  - AUTOANTIBODIES, 6517
- NEOPLASM METASTASIS
  - ANIMAL MODEL, RAT, 6436*
  - LYMPHOCYTES, 6363
- OCCUPATIONAL HAZARD
  - EPIDEMIOLOGY, REVIEW, 6050*
- 1,10-PHENANTHROLINE
  - NEOPLASM METASTASIS, 6416
- 2,6-PIPERAZINEDIONE, 4,4'-PROPYLENEDI-
  - NEOPLASM METASTASIS, 6416
- RADIATION, IONIZING
  - DOSE-RESPONSE STUDY, MOUSE, 6250*, 6265*
- RIBONUCLEASE
  - SERUM LEVELS, 6556
- RORSCHACH TEST
  - DIAGNOSTIC VALUE, 6531*
- SARCOMA
  - NEOPLASM METASTASIS, 6436*
- TOLUENE-2,4-DIAMINE
  - CARCINOGENIC ACTIVITY, REVIEW, 6055*
- TRANSPLANTATION, HETEROLOGOUS
  - CORTICOTROPIN, 6375
  - ULTRASTRUCTURAL STUDY, 6375

LUPUS ERYTHEMATOSUS, SYSTEMIC
- CELLULAR INCLUSIONS
  - ULTRASTRUCTURAL STUDY, 6443*
- ENDOPLASMIC RETICULUM
  - ULTRASTRUCTURAL STUDY, 6443*
- PAROTID GLAND
  - CELLULAR INCLUSIONS, 6479*
  - ULTRASTRUCTURAL STUDY, 6443*
- VIRUS, C-TYPE RNA TUMOR
  - ANTIGEN-ANTIBODY COMPLEX, 6319
  - ANTIGENS, VIRAL, 6319
- VIRUS, HUMAN EMBRYO LUNG 12
  - ANTIGENS, VIRAL, 6319

LYMPHATIC NEOPLASMS
- GLOMANGIOMA
  - ULTRASTRUCTURAL STUDY, 6440*
- GRANULOMA
  - NEPHRITIS, INTERSTITIAL, 6458*
- NEVUS
  - ULTRASTRUCTURAL STUDY, 6440*
- 1,2-OXATHIOLANE, 2,2-DIOXIDE
  - CARCINOGENIC POTENTIAL, MOUSE, 6223*
- VIRUS, C-TYPE
  - ANTIGENS, VIRAL, 6295
  - EPIDEMIOLOGY, MOUSE, 6295

LYMPHOCYTE DEPLETION
- HODGKIN'S DISEASE
  - IMMUNITY, CELLULAR, REVIEW, 6094*
- IMMUNOLOGIC DEFICIENCY SYNDROMES
  - B-LYMPHOCYTES, 6389*
- LEUKEMIA, LYMPHOBLASTIC
  - INSULIN, 6564

LYMPHOCYTE TRANSFORMATION
- BURKITT'S LYMPHOMA
  - CELLS, CULTURED, 6361
- COLONIC NEOPLASMS
  - TISSUE EXTRACTS, 6384*
- HEPATOMA
  - CONCANAVALIN A, 6366
  - DEXTRAN SULFATE, 6366
  - GROWTH, 6366
  - PLANT AGGLUTININS, 6366
- INFECTIOUS MONONUCLEOSIS
  - CELLS, CULTURED, 6361
- VIRUS, EPSTEIN-BARR
  - ANTIGENS, VIRAL, 6312, 6313
  - CELL LINE, 6312
  - CELLS, CULTURED, 6361
  - VIRUS REPLICATION, 6312
- VIRUS, FRIEND MURINE LEUKEMIA
  - B-LYMPHOCYTES, 6328*
  - T-LYMPHOCYTES, 6328*

- STRONTIUM RADIOISOTOPES, 6328*

- LYMPHOCYTES
  - ANTIPYRINE
    - ARYL HYDROCARBON HYDROXYLASES, 6210*
  - ARSENIC ACID, DISODIUM SALT
    - AMINO ACIDS, 6547
    - DOSE-RESPONSE STUDY, 6547
    - NUCLEIC ACIDS, 6547
    - TRIPHOSPHATES, 6547
  - ARYL HYDROCARBON HYDROXYLASES
    - FLUORESCENCE SPECTROMETRY, 6202*
  - ATEBRINE
    - CHROMOSOME ABERRATIONS, 6212*
  - BENZO(A)PYRENE
    - ARYL HYDROCARBON HYDROXYLASES, 6202*
    - HYDRO-LYASES, 6199*
    - OXIDOREDUCTASES, 6199*
    - TRANSFERASES, 6199*
  - BREAST NEOPLASMS
    - IMMUNITY, CELLULAR, 6386*
  - COLONIC NEOPLASMS
    - DNA REPLICATION, 6384*
  - COMPLEMENT
    - CELLS, CULTURED, REVIEW, 6097*
  - FIBROSARCOMA
    - IMMUNITY, CELLULAR, 6388*
  - GASTROINTESTINAL NEOPLASMS
    - NEOPLASM METASTASIS, 6363
    - NUCLEOLAR TYPE, 6363
  - HEAVY CHAIN DISEASE
    - CELLULAR INCLUSIONS, 6364
  - IMMUNOGLOBULINS
    - CELLS, CULTURED, REVIEW, 6097*
  - ISOANTIGENS
    - CELLS, CULTURED, REVIEW, 6097*
  - LEUKEMIA, LYMPHOCYTIC
    - CHROMOSOME ABERRATIONS, 6358, 6390*
    - CLASSIFICATION AND PROGNOSIS, 6448*
    - IMMUNE RESPONSE, 6358
    - SEQUENTIAL ANALYSIS, 6359
    - ULTRASTRUCTURAL STUDY, 6448*
  - LUNG NEOPLASMS
    - IMMUNITY, CELLULAR, 6362
    - NEOPLASM METASTASIS, 6363
    - NUCLEOLAR TYPE, 6363
  - MACROGLOBULINEMIA
    - CELLULAR INCLUSIONS, 6364
  - MELANOMA
    - IMMUNITY, CELLULAR, 6386*
  - MULTIPLE MYELOMA
    - CELLULAR INCLUSIONS, 6364
  - NEOPLASMS
    - CELLS, CULTURED, REVIEW, 6097*
  - THYMUS NEOPLASMS
    - CELL DIFFERENTIATION, 6030
  - UREA, 1-BUTYL-1-NITROSO-
    - CHROMOSOMES, 6219*
  - VIRUS, EPSTEIN-BARR
    - CELLS, CULTURED, REVIEW, 6097*
  - VIRUS, JM-V HERPES
    - CHROMOSOME ABERRATIONS, 6324*

- -LYMPHOCYTES
  - AGAMMAGLOBULINEMIA
    - CELL DIFFERENTIATION, 6350
  - CARCINOMA, EHRLICH TUMOR
    - EMBRYO, MOUSE, 6369
    - LIVER, MOUSE, 6369
    - SPLEEN, MOUSE, 6369
  - CONCANAVALIN A
    - IMMUNE RESPONSE, AKR MICE, 6360
  - DEXTRAN SULFATE
    - CELL DIFFERENTIATION, 6368
    - DNA REPLICATION, 6368
  - HISTOCOMPATIBILITY ANTIGENS
    - ISOLATION AND CHARACTERIZATION, 6380*
  - HODGKIN'S DISEASE
    - IMMUNITY, CELLULAR, 6389*
  - IGD
    - CELL DIFFERENTIATION, REVIEW, 6098*
    - IMMUNOGENETICS, REVIEW, 6098*
  - IGM
    - ANTIGENIC DETERMINANTS, 6480*
  - IMMUNOGLOBULINS, SURFACE
    - ANTIGENIC DETERMINANTS, 6480*
    - CELL DIFFERENTIATION, REVIEW, 6098*
  - IMMUNOLOGIC DEFICIENCY SYNDROMES
    - IMMUNITY, CELLULAR, 6389*
    - IMMUNOGLOBULINS, SURFACE, 6389*
    - LYMPHOCYTE DEPLETION, 6389*
  - LEUKEMIA, LYMPHOBLASTIC
    - HISTOCOMPATIBILITY ANTIGENS, 6383*
    - IMMUNITY, CELLULAR, 6389*
  - LEUKEMIA, LYMPHOCYTIC
    - ANTIGEN-ANTIBODY REACTIONS, 6385*
    - HISTOCOMPATIBILITY ANTIGENS, 6383*
    - IMMUNITY, CELLULAR, 6389*
    - ROSETTE FORMATION, 6448*
  - LEUKEMIA, MYELOBLASTIC
    - HISTOCOMPATIBILITY ANTIGENS, 6383*
  - LEUKEMIA, MYELOCYTIC
    - HISTOCOMPATIBILITY ANTIGENS, 6383*
  - LIPOPOLYSACCHARIDES
    - CELL DIFFERENTIATION, 6368
    - DNA REPLICATION, 6368
    - IMMUNE RESPONSE, AKR MICE, 6360
  - MULTIPLE MYELOMA
    - IMMUNITY, CELLULAR, 6389*
  - PLANT AGGLUTININS
    - IMMUNE RESPONSE, AKR MICE, 6360
  - TUBERCULIN
    - CELL DIFFERENTIATION, 6368
    - DNA REPLICATION, 6368
  - VIRUS, FRIEND MURINE LEUKEMIA
    - LYMPHOCYTE TRANSFORMATION, 6328*

- T-LYMPHOCYTES
  - AGAMMAGLOBULINEMIA
    - ANTIBODY FORMATION, 6350
    - PLASMA CELLS, 6350
  - ANTIGENS, HETEROGENETIC
    - BENZENESULFONIC ACID, 2,4,6-TRINITRO-, 6345
    - GLUTARALDEHYDE, 6345
  - ANTIGENS, NEOPLASM
    - GRAFT VS HOST REACTION, REVIEW, 6096*
    - IMMUNITY, CELLULAR, REVIEW, 6096*
    - IMMUNITY, PASSIVE, REVIEW, 6096*
  - CONCANAVALIN A

    IMMUNE RESPONSE, AKR MICE, 6360
  ERYTHROLEUKEMIA
    IMMUNE RESPONSE, MOUSE, 6355
    IMMUNITY, CELLULAR, 6355
  HISTOCOMPATIBILITY ANTIGENS
    GRAFT VS HOST REACTION, REVIEW, 6096*
    IMMUNITY, CELLULAR, REVIEW, 6096*
  HODGKIN'S DISEASE
    IMMUNITY, CELLULAR, REVIEW, 6094*
  IGM
    ANTIGENIC DETERMINANTS, 6480*
  IMMUNITY, CELLULAR
    REVIEW, 6092*
  IMMUNOGLOBULINS, SURFACE
    ANTIGENIC DETERMINANTS, 6480*
  ISOANTIGENS
    GRAFT VS HOST REACTION, REVIEW, 6096*
    IMMUNITY, CELLULAR, REVIEW, 6096*
    LEUKOCYTE CULTURE TEST, MIXED, 6361
  LEUKEMIA, LYMPHOBLASTIC
    CELL MEMBRANE, 6125*
    INSULIN, 6564
    ROSETTE FORMATION, 6125*
  LEUKEMIA, LYMPHOCYTIC
    IMMUNE RESPONSE, REVIEW, 6094*
    IMMUNOGLOBULINS, SURFACE, 6357
    ROSETTE FORMATION, 6448*
  LIPOPOLYSACCHARIDES
    IMMUNE RESPONSE, AKR MICE, 6360
  LYMPHOSARCOMA
    IMMUNE RESPONSE, REVIEW, 6094*
  MYELOMA PROTEINS
    ANTIBODY SPECIFICITY, 6480*
  PLANT AGGLUTININS
    IMMUNE RESPONSE, AKR MICE, 6360
  RADIATION, IONIZING
    IMMUNITY, PASSIVE, 6345
  VIRUS, FRIEND MURINE LEUKEMIA
    LYMPHOCYTE TRANSFORMATION, 6328*
  VIRUS, MOLONEY MURINE SARCOMA
    ANTILYMPHOCYTE SERUM, 6332*
    IMMUNE RESPONSE, 6332*
    RADIATION, IONIZING, 6332*
  VIRUS, MURINE LEUKEMIA
    ANTIGENS, 6331*
    ANTIGENS, VIRAL, 6346
    HISTOCOMPATIBILITY ANTIGENS, 6346
    ISOANTIGENS, 6346

LYMPHOKINES
  GRANULOMA
    MACROPHAGE MEMBRANE POTENTIAL, 6370
  MELANOMA
    BCG VACCINATION, 6370
    IMMUNITY, CELLULAR, 6370
    MACROPHAGE MEMBRANE POTENTIAL, 6370
    TUBERCULIN, 6370
  NEVUS, PIGMENTED
    MACROPHAGE MEMBRANE POTENTIAL, 6370

LYMPHOMA (GENERAL AND UNSPECIFIED)
  SEE ALSO HODGKIN'S DISEASE/BURKITT'S LYMPHOMA/SARCOMA, RETICULUM CELL/LYMPHOSARCOMA
  ANTIGEN-ANTIBODY COMPLEX
    IMMUNITY, CELLULAR, 6356
  ANTIGENS, NEOPLASM
    IMMUNITY, CELLULAR, 6356
  CARCINOGEN, CHEMICAL
    SCREENING METHOD, 6187*
  CHROMOSOME ABNORMALITIES
    REVIEW, 6119*
  DNA, SINGLE STRANDED
    ANTIBODIES, 6362*
  EPIDEMIOLOGY
    AUSTRALIA, 6500
  FISHES
    INCIDENCE RATES, IRELAND, 6525*
  IMMUNE SERUMS
    ANTIBODY FORMATION, 6356
    IMMUNITY, CELLULAR, 6356
  INCIDENCE RATES
    EPIDEMIOLOGY, INDIA, 6511
  INTESTINAL NEOPLASMS
    EPIDEMIOLOGY, IRAN, 6533*
  NEOPLASMS
    EPIDEMIOLOGY, CHEMISTS, 6518

LYMPHOSARCOMA
  ATAXIA TELANGIECTASIA
    CHROMOSOME ABNORMALITIES, REVIEW, 6121*
  INTESTINAL NEOPLASMS
    EPIDEMIOLOGY, IRAN, 6533*
  T-LYMPHOCYTES
    IMMUNE RESPONSE, REVIEW, 6094*
  VIRUS, EPSTEIN-BARR
    ANTIBODIES, VIRAL, 6340*

LYSINE
  PLASMACYTOMA
    IMMUNOGLOBULINS, LIGHT CHAIN, 63

LYSOSOMES
  HEPATOMA
    ENZYMATIC ACTIVITY, 6587*

MACROGLOBULINEMIA
  BLOOD PROTEINS
    POLYACRYLAMIDE GEL ELECTROPHORES 6351
  CHROMOSOME ABNORMALITIES
    REVIEW, 6119*
  LYMPHOCYTES
    CELLULAR INCLUSIONS, 6364
  PLASMA CELLS
    CELLULAR INCLUSIONS, 6364

MACROPHAGES
  CARCINOMA, EHRLICH TUMOR
    EMBRYO, MOUSE, 6369
    SPLEEN, MOUSE, 6369
  HODGKIN'S DISEASE
    BACTERIOLYSIS, 6365
    PHAGOCYTOSIS, 6365
  IMMUNE SERUMS
    MIGRATION INHIBITORY FACTOR, 63
  IMMUNITY, CELLULAR
    REVIEW, 6092*
  RETICULOENDOTHELIOSIS
    HAIRY CELLS, 6353
    IGM, 6353

-
  -
    - IMMUNOGLOBULINS, 6353
  - SMOKING
    - AGGLUTINATION, 6173*
    - CONCANAVALIN A, 6173*
    - GLUTARALDEHYDE, 6173*
    - MANNOSE, 6173*
    - PULMONARY ALVEOLI, 6173*

- MAGNESIUM
  - VIRUS, AVIAN MYELOBLASTOSIS
    - DNA NUCLEOTIDYLTRANSFERASES, 6578*

- MALIGNANT CARCINOID SYNDROME
  - HEART NEOPLASMS
    - CASE REPORT, 6399
    - ULTRASTRUCTURAL STUDY, 6399

- MALONIC ACID
  - AFLATOXIN B1
    - ACETATE INCORPORATION, 6168*

- MAMMAE
  - RADIATION, IONIZING
    - GRAFT VS HOST REACTION, 6257*
    - TRANSPLANTATION, HOMOLOGOUS, 6257*

- MAMMARY NEOPLASMS, EXPERIMENTAL
  - ADENOCARCINOMA
    - IMMUNE RESPONSE, NEWBORN AND ADULT MOUSE, 6377
    - IMMUNITY, CELLULAR, 6367
  - CARCINOGEN, CHEMICAL
    - IMMUNE RESPONSE, REVIEW, 6027
  - IMMUNOSUPPRESSION
    - NEOPLASM TRANSPLANTATION, 6374
  - LACTATE DEHYDROGENASE
    - NEOPLASM METASTASIS, 6430, 6561
  - NEOPLASM TRANSPLANTATION
    - ULTRASTRUCTURAL STUDY, NUDE MOUSE, 6374
  - TRANSPLANTATION IMMUNOLOGY
    - NEOPLASM TRANSPLANTATION, 6377
  - VIRUS, C-TYPE
    - ANTIGENS, VIRAL, 6295
    - EPIDEMIOLOGY, MOUSE, 6295
  - VIRUS, MURINE MAMMARY TUMOR
    - IMMUNE RESPONSE, REVIEW, 6027

- MANGANESE
  - VIRUS, AVIAN MYELOBLASTOSIS
    - DNA NUCLEOTIDYLTRANSFERASES, 6578*

- MANNITOL
  - ARTHRITIS, RHEUMATOID
    - CARCINOGENIC POTENTIAL, 6167
  - CHROMOSOME ABERRATIONS
    - ARTHRITIS, 6166

- MANNOSE
  - SMOKING
    - MACROPHAGES, 6173*

- MEGAKARYOCYTES
  - LEUKEMIA, MYELOCYTIC
    - ULTRASTRUCTURAL STUDY, 6457*

- MELANIN
  - MELANOMA
    - TRANSPLANTATION, HETEROLOGOUS, 6375
  - ULTRAVIOLET RAYS
    - THYMINE DIMERS, 6236

- MELANOCYTES
  - MELANOMA
    - ULTRASTRUCTURAL STUDY, 6404

- MELANOMA
  - ADENOSINE CYCLIC 3',5' MONOPHOSPHATE
    - ENZYMATIC ACTIVITY, 6600*
    - GROWTH, 6600*
    - GROWTH AND PIGMENTATION, REVIEW, 6600*
  - AGE FACTORS
    - EPIDEMIOLOGY, 6474*
  - AMYLOIDOSIS
    - HYALIN SUBSTANCE, 6400
  - ANTIBODIES, NEOPLASM
    - BINDING, 6391*
  - ANTIGENIC DETERMINANTS
    - IMMUNE RESPONSE, REVIEW, 6095*
  - ANTIGENS, NEOPLASM
    - IMMUNITY, CELLULAR, REVIEW, 6095*
  - BCG VACCINATION
    - LYMPHOKINES, 6370
  - BREAST NEOPLASMS
    - LEUKOCYTE CULTURE TEST, MIXED, 6386*
    - NEOPLASMS, MULTIPLE PRIMARY, 6406
  - CELLS, CULTURED
    - ULTRASTRUCTURAL STUDY, 6404
  - CHELATING AGENTS
    - CLOSTRIDIOPEPTIDASE A, 6416
  - CHROMOSOME ABERRATIONS
    - CELL LINE, AMELANOTIC, 6482*
  - COLLAGEN
    - HISTOLOGICAL STUDY, 6403
  - ETHYL ALCOHOL
    - EPIDEMIOLOGY, MORMONS, 6503
  - EYE NEOPLASMS
    - CELL DIFFERENTIATION, 6405
    - ULTRASTRUCTURAL STUDY, 6404, 6405
  - GROWTH
    - ENZYMATIC ACTIVITY, 6600*
    - PINEALECTOMY, 6545
  - HODGKIN'S DISEASE
    - NEOPLASMS, MULTIPLE PRIMARY, 6406
  - IGM
    - SERUM LEVELS, 6354
  - IMMUNOGLOBULINS
    - CELLULAR LOCALIZATION, 6391*
  - INTESTINAL NEOPLASMS
    - NEOPLASMS, MULTIPLE PRIMARY, 6406
  - KARYOTYPING
    - CELL LINE, AMELANOTIC, 6482*
  - LEUKEMIA
    - NEOPLASMS, MULTIPLE PRIMARY, 6406
  - LUNG NEOPLASMS
    - NEOPLASM METASTASIS, REVIEW, 6431
  - LYMPHOCYTES
    - IMMUNITY, CELLULAR, 6386*
  - LYMPHOKINES
    - IMMUNITY, CELLULAR, 6370
    - MACROPHAGE MEMBRANE POTENTIAL, 6370
  - MELANOCYTES
    - ULTRASTRUCTURAL STUDY, 6404
  - MELATONIN

    - GROWTH, 6545
    - ULTRASTRUCTURAL STUDY, PINEAL BODY, 6545
  - MOUTH NEOPLASMS
    - IMMUNITY, CELLULAR, 6367
  - MSH
    - ADENOSINE CYCLIC 3',5' MONOPHOSPHATE, 6600*
    - ENZYMATIC ACTIVITY, 6600*
    - GROWTH, 6600*
    - GROWTH AND PIGMENTATION, REVIEW, 6600*
  - NEOPLASM METASTASIS
    - EPIDEMIOLOGY, 6474*
    - IGM, 6354
  - NEOPLASM TRANSPLANTATION
    - DOSE-RESPONSE STUDY, MOUSE, 6478*
  - NEOPLASMS, CONNECTIVE TISSUE
    - HISTOLOGICAL STUDY, 6403
  - NEOPLASMS, MULTIPLE PRIMARY
    - CASE REPORT, 6407
    - EPIDEMIOLOGY, 6406
  - OVARIAN NEOPLASMS
    - NEOPLASMS, MULTIPLE PRIMARY, 6406
  - PIGMENTATION
    - THYMINE DIMERS, 6236
  - 2,6-PIPERAZINEDIONE, 4,4'-PROPYLENEDI-
    - CATHEPSIN, 6416
  - PIPERAZINES
    - CLOSTRIDIOPEPTIDASE A, 6416
  - PLANT AGGLUTININS
    - IMMUNOGLOBULINS, 6391*
  - RNA
    - CYTOTOXICITY TESTS, IMMUNOLOGIC, 6343
    - IMMUNE RESPONSE, HETEROLOGOUS LYMPHOCYTES, 6343
  - SARCOMA
    - NEOPLASMS, MULTIPLE PRIMARY, 6406
  - SEX FACTORS
    - EPIDEMIOLOGY, 6474*
  - SKIN NEOPLASMS
    - EPIDEMIOLOGY, 6474*
  - TRANSPLANTATION, HETEROLOGOUS
    - MELANIN, 6375
    - MOUSE, NUDE, 6376
  - TUBERCULIN
    - LYMPHOKINES, 6370
  - TYROSINE
    - GROWTH AND PIGMENTATION, REVIEW, 6600*
  - ULTRAVIOLET RAYS
    - DOSE-RESPONSE STUDY, 6236
    - THYMINE DIMERS, 6236
  - URIDINE, 5-BROMO-2'-DEOXY-
    - TRANSPLANTATION IMMUNOLOGY, REVIEW, 6600*
  - VIRUS, RNA TUMOR
    - GROWTH AND PIGMENTATION, REVIEW, 6600*

- MELATONIN
  - MELANOMA
    - GROWTH, 6545
    - ULTRASTRUCTURAL STUDY, PINEAL BODY, 6545

- MENINGES
  - BREAST NEOPLASMS
    - NEOPLASM METASTASIS, 6460*
  - LUNG NEOPLASMS
    - NEOPLASM METASTASIS, 6460*
  - NEOPLASM METASTASIS
    - HISTOLOGICAL STUDY, 6460*
  - NERVOUS SYSTEM NEOPLASMS
    - NEOPLASM METASTASIS, 6460*
  - STOMACH NEOPLASMS
    - NEOPLASM METASTASIS, 6460*
  - UROGENITAL NEOPLASMS
    - NEOPLASM METASTASIS, 6460*

- MENINGIOMA
  - CELL LINE
    - CHROMOSOMES, 6437*
    - CONTACT INHIBITION, 6437*
  - CHROMOSOMES
    - CONTACT INHIBITION, 6437*

- MENOPAUSE
  - RESERPINE
    - PROLACTIN, 6229*

- MESOTHELIOMA
  - ASBESTOS
    - CASE REPORT, 6466*
    - ENVIRONMENTAL HAZARD, 6011
    - EPIDEMIOLOGY, REVIEW, 6050*
    - FIBERS, 6073*
  - LUNG NEOPLASMS
    - ASBESTOS, 6011, 6517
    - AUTOANTIBODIES, 6517

- METHANE, SULFINYLBIS-
  - HYBRID CELLS
    - GLOBIN, 6576*
  - RADIATION, IONIZING
    - DNA, 6270*
  - VIRUS, FRIEND MURINE LEUKEMIA
    - CELL CYCLE KINETICS, 6287
    - VIRUS REPLICATION, 6287

- METHANE, TETRANITRO-
  - CARCINOEMBRYONIC ANTIGEN
    - ANTIGEN-ANTIBODY REACTIONS, 6348

- METHANESULFONIC ACID, ETHYL ESTER
  - ANEMIA, APLASTIC
    - CHROMOSOME ABERRATIONS, 6434*
  - ASCOMYCETES
    - MUTAGENIC ACTIVITY, 6217*

- METHANESULFONIC ACID, METHYL ESTER
  - ASCOMYCETES
    - MUTAGENIC ACTIVITY, 6217*
  - NERVOUS SYSTEM NEOPLASMS
    - NEOPLASM TRANSPLANTATION, 6053*
    - REVIEW, 6053*

- METHIONINE
  - DNA, MITOCHONDRIAL
    - DNA REPLICATION, 6551

- METHOTREXATE
  - CARCINOGEN, CHEMICAL
    - SCREENING METHOD, 6187*

- N-METHYL-N'-NITRO-N-NITROSOGUANIDINE
  - SEE GUANIDINE, 1-METHYL-3-NITRO-1-

NITROSO-

METHYL SULFOXIDE
  SEE METHANE, SULFINYLBIS-

3-METHYLCHOLANTHRENE
  SEE CHOLANTHRENE, 3-METHYL-

METHYLTRANSFERASES
  LEUKEMIA
   ENZYMATIC ACTIVITY, LEUKOCYTES, 6532*

MICROSOMES
  CARCINOMA, EHRLICH TUMOR
   PHOSPHOLIPIDS, 6598*
  ETHYLENE, CHLORO-
   MUTAGENIC ACTIVITY, 6138
  HEPATOMA
   GANGLIOSIDES, 6597*
  MORPHOLINE, N-NITROSO-
   MUTAGENIC ACTIVITY, 6138
  NITROSAMINES
   MUTAGENIC ACTIVITY, 6138

MICROSOMES, LIVER
  ACETAMIDE, THIO-
   PHOSPHOLIPIDS, 6183*
  BENZ(A)ANTHRACENE
   SALMONELLA TYPHIMURIUM, 6197*
  BENZ(A)ANTHRACENE, 7,12-DIMETHYL-
   SALMONELLA TYPHIMURIUM, 6197*
  BENZO(A)PYRENE
   PHENOL, (1,1-DIMETHYLETHYL)-4-METHOXY-, 6146
   SALMONELLA TYPHIMURIUM, 6197*
  CARCINOGEN, CHEMICAL
   REVIEW, 6042*
  2-NAPHTHYLAMINE
   HYDROXYLAMINE, N-2-NAPHTHYL-, 6186*
   NADP, 6186*
   OXIDATION-REDUCTION, 6186*
   OXIDOREDUCTASES, 6186*
  TRIAZENE, 3,3-DIMETHYL-1-PHENYL-
   MUTAGENIC METABOLITE, 6171*

MICROTUBULES
  ADENOSINE CYCLIC 3',5' MONOPHOSPHATE
   RADIATION EFFECTS, HAIR FOLLICLES, MOUSE, 6258*
  COLCHICINE, N-DEACETYL-N-METHYL-
   RADIATION EFFECTS, HAIR FOLLICLES, MOUSE, 6258*
  LEUROCRISTINE
   RADIATION EFFECTS, HAIR FOLLICLES, MOUSE, 6258*
   RADIATION, IONIZING, 6258*
  RADIATION, IONIZING
   ADENOSINE CYCLIC 3',5' MONOPHOSPHATE, 6258*
   COLCHICINE, N-DEACETYL-N-METHYL-, 6258*

MIGRATION INHIBITORY FACTOR
  IMMUNE SERUMS
   MACROPHAGES, 6392*

MITOCHONDRIA
  CARCINOMA, EHRLICH TUMOR
   PHOSPHOLIPIDS, 6598*
  HEPATOMA
   CARDIOLIPINS, 6581*
   GANGLIOSIDES, 6597*
   PHOSPHOTRANSFERASES, 6581*

MITOCHONDRIA, LIVER
  ACETAMIDE, THIO-
   PHOSPHOLIPIDS, 6183*

MITOMYCIN C
  ANEMIA, APLASTIC
   CHROMOSOME ABERRATIONS, 6434*

MIXED FUNCTION OXIDASE
  SEE OXIDOREDUCTASES

MONOCROTALINE
  ADRENAL GLAND NEOPLASMS
   ADENOMA, 6213*
  HEPATOMA
   RAT, 6213*
  LEUKEMIA, MYELOBLASTIC
   RAT, 6213*
  LUNG NEOPLASMS
   ADENOCARCINOMA, 6213*

MONOCYTES
  BENZ(A)ANTHRACENE
   HALF-LIFE, 6198*
  HODGKIN'S DISEASE
   BACTERIOLYSIS, 6365
  MULTIPLE MYELOMA
   ANTIBODY FORMATION, 6350

MORPHOLINE, N-NITROSO-
  MICROSOMES
   MUTAGENIC ACTIVITY, 6138
  SALMONELLA TYPHIMURIUM
   MUTAGENIC ACTIVITY, 6138

MOSAICISM
  TERATOID TUMOR
   CELL DIFFERENTIATION, 6490*

MOUTH NEOPLASMS
  ALCOHOL DRINKING
   EPIDEMIOLOGY, 6534*
   STATISTICAL ANALYSIS, 6534*
  CARCINOMA, BASAL CELL
   CASE REPORT, 6463*
   PROSTHESIS, 6463*
   TRANSPLANTATION, HOMOLOGOUS, 6463*
  CARCINOMA, EPIDERMOID
   EPIDEMIOLOGY, SRI LANKA, 6513
   OCCUPATIONAL HAZARD, 6530*
   PRECANCEROUS CONDITIONS, 6124*
  FISHES
   SEWAGE, 6523*
  LEUKOPLAKIA
   PRECANCEROUS CONDITIONS, 6124*
   REVIEW, 6124*
  MELANOMA
   IMMUNITY, CELLULAR, 6367
  PAPILLOMA
   WHITE CROAKER, 6523*
  TEXTILE INDUSTRY
   EPIDEMIOLOGY, ENGLAND, 6530*

    WOUNDS AND INJURIES
        FISHES, 6523*

MSH
    MELANOMA
        ADENOSINE CYCLIC 3',5'
          MONOPHOSPHATE, 6600*
        ENZYMATIC ACTIVITY, 6600*
        GROWTH, 6600*
        GROWTH AND PIGMENTATION, REVIEW,
          6600*

MUCIN
    STOMACH NEOPLASMS
        TRANSPLANTATION, HETEROLOGOUS,
          6375

MUCOPOLYSACCHARIDES
    CERVIX NEOPLASMS
        NEOPLASM METASTASIS, 6475*

MULTIPLE MYELOMA
    ANTIGENS, NEOPLASM
        IMMUNE SERUMS, 6381*
    BLOOD PROTEINS
        POLYACRYLAMIDE GEL ELECTROPHORESIS,
          6351
    BONE MARROW CELLS
        ANTIGEN-ANTIBODY REACTIONS, 6381*
    BONE NEOPLASMS
        BIOCHEMICAL STUDY, REVIEW, 6103*
    BURKITT'S LYMPHOMA
        ANTIGENIC DETERMINANTS, 6381*
    CHROMOSOME ABNORMALITIES
        REVIEW, 6119*
    GENETICS
        CASE REPORT, 6411
        IMMUNOGLOBULINS, 6411
    IMMUNOGLOBULINS, LIGHT CHAIN
        AMYLOIDOSIS, 6349
        BLOOD UREA NITROGEN, 6349
        EPIDEMIOLOGY, 6349
    LEUKEMIA, PLASMACYTIC
        EPIDEMIOLOGY, 6349
        IMMUNOGLOBULINS, LIGHT CHAIN, 6349
    LYMPHOCYTES
        CELLULAR INCLUSIONS, 6364
    B-LYMPHOCYTES
        IMMUNITY, CELLULAR, 6389*
    MONOCYTES
        ANTIBODY FORMATION, 6350
    PLASMA CELLS
        CELLULAR INCLUSIONS, 6364

MUTAGENS
    CARCINOGENIC METABOLITE
        REVIEW, 6040*
        SCREENING METHOD, 6040*
    DNA REPAIR
        REVIEW, 6043*

MUTATION
    NEOPLASMS
        ASBESTOS, 6116*
        HORMONES, 6116*
        REVIEW, 6116*

MYASTHENIA GRAVIS
    THYMUS EXTRACTS
        HEMATOPOIESIS, 6387*
        IMMUNITY, CELLULAR, 6387*
        IMMUNOGLOBULINS, 6387*

MYCOSIS FUNGOIDES
    IGM
        SERUM LEVELS, 6354

MYELOID METAPLASIA
    HEMATOPOIESIS
        SPLEEN, REVIEW, 6126*
    HEMATOPOIETIC STEM CELLS
        IMMUNE RESPONSE, REVIEW, 6126*
    RADIATION, IONIZING
        SPLEEN, REVIEW, 6126*

MYELOMA
    SEE MULTIPLE MYELOMA

MYELOMA PROTEINS
    IMMUNOGLOBULINS, HEAVY CHAIN
        CELL TRANSFORMATION, NEOPLASTIC,
          6024
    IMMUNOGLOBULINS, LIGHT CHAIN
        CELL TRANSFORMATION, NEOPLASTIC,
          6024
    T-LYMPHOCYTES
        ANTIBODY SPECIFICITY, 6480*

MYELOPROLIFERATIVE DISORDERS
    CHROMOSOME ABERRATIONS
        CASE REPORT, 6419
        PLANT AGGLUTININS, 6419

MYOMA
    UTERINE NEOPLASMS
        CASE REPORT, 6476*

NADP
    2-NAPHTHYLAMINE
        MICROSOMES, LIVER, 6186*

NAPHTHALENE
    CYTOCHROME P-450
        DIHYDRODIOL EPOXIDES, 6191*
        METABOLISM, RAT, 6191*
    GASTROINTESTINAL NEOPLASMS
        ADENOCARCINOMA, 6516
        CARCINOMA, SCIRRHOUS, 6516
        OCCUPATIONAL HAZARD, 6516
    LARYNGEAL NEOPLASMS
        CARCINOMA, 6516
        CARCINOMA, EPIDERMOID, 6516
        OCCUPATIONAL HAZARD, 6516

NAPHTHALENE, 1-NITRO-
    URINE
        CARCINOGENIC METABOLITE, RAT,
          6192*

NAPHTHALENE, 2-NITRO-
    URINE
        CARCINOGENIC METABOLITE, RAT,
          6192*

2-NAPHTHYLAMINE
    BLADDER NEOPLASMS
        HAMSTER, 6190*
    MICROSOMES, LIVER

        - HYDROXYLAMINE, N-2-NAPHTHYL-, 6186*
        - NADP, 6186*
        - OXIDATION-REDUCTION, 6186*
        - OXIDOREDUCTASES, 6186*

- NASOPHARYNGEAL NEOPLASMS
    - DIET
        - EPIDEMIOLOGY, REVIEW, 6059*
    - DIETHYLAMINE, N-NITROSO-
        - COBALT CHLORIDE, 6160
        - LIVER NEOPLASMS, 6160
    - NEUROEPITHELIOMA
        - DIETHYLAMINE, N-NITROSO-, 6160
    - VIRUS, EPSTEIN-BARR
        - DNA-DNA HYBRIDIZATION, REVIEW, 6018
        - EPIDEMIOLOGY, REVIEW, 6082*

- NECK NEOPLASMS
    - LIPOMA
        - CASE REPORT, 6465*

- NECROSIS
    - LIVER NEOPLASMS
        - AFLATOXIN B1, 6140

- NEOPLASM METASTASIS
    - BONE NEOPLASMS
        - ANTIGENS, NEOPLASM, 6373
        - CASE REPORT, 6473*
        - EPIDEMIOLOGY, REVIEW, 6103*
        - GRAFT REJECTION, 6373
    - BREAST NEOPLASMS
        - BLOOD VESSELS, 6398
        - CELL CYCLE KINETICS, 6497
        - MENINGES, 6460*
    - CARCINOMA, BRONCHOGENIC
        - IGM, 6354
    - CERVIX NEOPLASMS
        - CONNECTIVE TISSUE, HISTOLOGICAL STUDY, 6475*
        - MUCOPOLYSACCHARIDES, 6475*
    - FIBROSARCOMA
        - VIRUS, GUINEA PIG HERPES, 6300
    - GASTROINTESTINAL NEOPLASMS
        - LYMPHOCYTES, 6363
    - GLIOBLASTOMA MULTIFORME
        - GROWTH, 6100*
    - GLIOMA
        - GROWTH, 6100*
    - HEPATOMA
        - ANIMAL MODEL, RAT, 6429
        - NEOPLASM TRANSPLANTATION, 6372, 6429
    - HODGKIN'S DISEASE
        - SPLENIC VEIN, 6467*
    - IGM
        - SERUM LEVELS, 6354
    - LUNG NEOPLASMS
        - ANIMAL MODEL, RAT, 6436*
        - LACTATE DEHYDROGENASE, 6430, 6561
        - LYMPHOCYTES, 6363
        - MENINGES, 6460*
        - 1,10-PHENANTHROLINE, 6416
        - 2,6-PIPERAZINEDIONE, 4,4'-PROPYLENEDI-, 6416
        - SARCOMA, 6436*
    - MAMMARY NEOPLASMS, EXPERIMENTAL
        - LACTATE DEHYDROGENASE, 6430, 6561
    - MELANOMA
        - EPIDEMIOLOGY, 6474*
        - IGM, 6354
    - MENINGES
        - HISTOLOGICAL STUDY, 6460*
    - NEOPLASM TRANSPLANTATION
        - NEOPLASMS, CONNECTIVE TISSUE, 6540
        - ORGAN CULTURE, 6540
    - NERVOUS SYSTEM NEOPLASMS
        - MENINGES, 6460*
    - 2,6-PIPERAZINEDIONE, 4,4'-PROPYLENEDI-
        - CLOSTRIDIOPEPTIDASE A, 6416
    - SALIVARY GLAND NEOPLASMS
        - RADIATION, IONIZING, 6274*
    - SARCOMA
        - TRANSPLANTATION, HOMOLOGOUS, 6436*
    - SARCOMA, OSTEOGENIC
        - DOG, REVIEW, 6104*
        - NEOPLASM TRANSPLANTATION, 6104*
    - STOMACH NEOPLASMS
        - IGM, 6354
        - MENINGES, 6460*
    - THYROID NEOPLASMS
        - ADENOCARCINOMA, 6473*
        - CASE REPORT, 6473*
    - TONGUE NEOPLASMS
        - CASE REPORT, 6461*
    - UROGENITAL NEOPLASMS
        - MENINGES, 6460*
    - UTERINE NEOPLASMS
        - EPIDEMIOLOGY, 6526*

- NEOPLASM RECURRENCE, LOCAL
    - BREAST NEOPLASMS
        - PRECANCEROUS CONDITIONS, 6496
    - UTERINE NEOPLASMS
        - EPIDEMIOLOGY, 6526*

- NEOPLASM REGRESSION, SPONTANEOUS
    - BREAST NEOPLASMS
        - IMMUNE RESPONSE, REVIEW, 6027
    - LIVER NEOPLASMS
        - CYCLOHEXANE, 1,2,3,4,5,6-HEXACHLORO-, ALPHA-ISOMER, 6158
    - VIRUS, ROUS SARCOMA
        - IMMUNITY, CELLULAR, 6278

- NEOPLASM TRANSPLANTATION
    - ANGIOSARCOMA
        - C-TYPE PARTICLES, 6302
    - BLADDER NEOPLASMS
        - IMMUNE RESPONSE, NEWBORN AND ADULT MOUSE, 6377
        - TRANSPLANTATION IMMUNOLOGY, 6377
    - CHICK EMBRYO
        - ORGAN CULTURE, 6540
    - COLONIC NEOPLASMS
        - ADENOCARCINOMA, 6225*
    - FIBROSARCOMA
        - ADRENAL CORTEX HORMONES, 6227*
        - IMMUNITY, CELLULAR, 6388*
    - GASTROINTESTINAL NEOPLASMS
        - IMMUNE RESPONSE, NEWBORN AND ADULT MOUSE, 6377
        - TRANSPLANTATION IMMUNOLOGY, 6377
    - HEPATOMA
        - ANIMAL MODEL, RAT, 6429
        - CELL DIFFERENTIATION, 6372

  IMMUNE RESPONSE, NEWBORN AND ADULT MOUSE, 6377
  KARYOTYPING, 6424
  NEOPLASM METASTASIS, 6372, 6429
  TRANSPLANTATION IMMUNOLOGY, 6377
 IMMUNITY, CELLULAR
  ANIMAL MODEL, ASPLENIC, ATHYMIC MOUSE, 6371
 IMMUNOSUPPRESSION
  ANIMAL MODEL, ASPLENIC, ATHYMIC MOUSE, 6371
 LEUKEMIA, MYELOCYTIC
  CELL DIFFERENTIATION, 6484*
  KARYOTYPING, 6484*
  UREA, 1-BUTYL-1-NITROSO-, 6484*
 LIPOSARCOMA
  C-TYPE PARTICLES, 6302
 LIVER NEOPLASMS
  HYPERPLASIA, 6372
 MAMMARY NEOPLASMS, EXPERIMENTAL
  IMMUNOSUPPRESSION, 6374
  TRANSPLANTATION IMMUNOLOGY, 6377
  ULTRASTRUCTURAL STUDY, NUDE MOUSE, 6374
 MELANOMA
  DOSE-RESPONSE STUDY, MOUSE, 6478*
 NEOPLASM METASTASIS
  ORGAN CULTURE, 6540
 NEOPLASMS, CONNECTIVE TISSUE
  NEOPLASM METASTASIS, 6540
 NERVOUS SYSTEM NEOPLASMS
  ALKYLATING AGENTS, 6053*
  METHANESULFONIC ACID, METHYL ESTER, 6053*
  UREA, ETHYL NITROSO-, 6053*
  UREA, METHYL NITROSO-, 6053*
 NEUROFIBROMA
  C-TYPE PARTICLES, 6302
 OVARIAN NEOPLASMS
  TERATOID TUMOR, 6489*
  TRANSPLANTATION IMMUNOLOGY, 6377
 RHABDOMYOSARCOMA
  C-TYPE PARTICLES, 6302
 SARCOMA
  C-TYPE PARTICLES, 6302
 SARCOMA, OSTEOGENIC
  NEOPLASM METASTASIS, 6104*
 TERATOID TUMOR
  CELL DIFFERENTIATION, 6489*
  CELL DIFFERENTIATION, REVIEW, 6129*
  GRAFT REJECTION, 6490*
 TESTICULAR NEOPLASMS
  TERATOID TUMOR, 6489*

NEOPLASMS, CONNECTIVE TISSUE
 FIBROMA
  GENETICS, 6422
 MELANOMA
  HISTOLOGICAL STUDY, 6403
 NEOPLASM TRANSPLANTATION
  NEOPLASM METASTASIS, 6540
 NEUROFIBROMATOSIS
  EPIDEMIOLOGY, 6441*
 NEVUS, PIGMENTED
  HISTOLOGICAL STUDY, 6403
 PROSTATE
  ULTRASTRUCTURAL STUDY, 6443*
 SARCOMA
  IRON, 6164
  NEUROFIBROMATOSIS, 6441*
 VIRUS, C-TYPE
  ANTIGENS, VIRAL, 6295
  EPIDEMIOLOGY, MOUSE, 6295

NEOPLASMS, EMBRYONAL AND MIXED
 EYE NEOPLASMS
  CELL DIFFERENTIATION, 6405
  ULTRASTRUCTURAL STUDY, 6405

NEOPLASMS, EXPERIMENTAL
 ARSENIC
  CARCINOGENIC POTENTIAL, REVIEW, 6049*
 BCG VACCINATION
  TRANSPLANTATION IMMUNOLOGY, 6378
 CARCINOGEN, CHEMICAL
  DIETARY FACTORS, REVIEW, 6059*
 DIET
  EPIDEMIOLOGY, REVIEW, 6059*
 LYMPHATIC METASTASIS
  NUCLEI, PLEOMORPHISM, 6427
 PRECANCEROUS CONDITIONS
  ULTRASTRUCTURAL STUDY, REVIEW, 6123*
 RNA
  GUERIN TUMOR, 6553, 6554
  LIVER, 6553, 6554
  NUCLEOTIDES, 6553
  OROTIC ACID, 6554
 VIRUS, SV40
  TRANSPLANTATION IMMUNOLOGY, 6378

NEOPLASMS (GENERAL AND UNSPECIFIED)
 SEE ALSO UNDER PARTICULAR SITE
 AGGLUTINATION
  ANTIGENIC DETERMINANTS, REVIEW, 6026
 ANTIGEN-ANTIBODY COMPLEX
  IMMUNE RESPONSE, REVIEW, 6025
 ANTIGEN SHEDDING, REVIEW
  IMMUNE RESPONSE, REVIEW, 6025
 ANTIGENIC DETERMINANTS
  IMMUNE RESPONSE, REVIEW, 6025
 ASBESTOS
  FIBERS, 6072*
  MUTATION, 6116*
 BLOOD PROTEINS
  STATISTICAL ANALYSIS, 6425
 CARCINOGEN, ENVIRONMENTAL
  EPIDEMIOLOGY, REVIEW, 6514
  REVIEW, 6037*
 CARCINOMA, EPIDERMOID
  EPIDEMIOLOGY, SRI LANKA, 6513
 CELL MEMBRANE
  ANTIGENIC DETERMINANTS, REVIEW, 6026
  ANTIGENS, NEOPLASMS, REVIEW, 6026
  ANTIGENS, VIRAL, REVIEW, 6026
  HISTOCOMPATIBILITY ANTIGENS, 6025
  HISTOCOMPATIBILITY ANTIGENS, REVIEW, 6026
 DIET
  EPIDEMIOLOGY, 6534*
 ENVIRONMENTAL POLLUTANTS
  ANIMAL MODEL, 6035*
  REVIEW, 6035*, 6037*
 EPIDEMIOLOGY, BANGLADESH

   - REVIEW, 6512
  - EPIDEMIOLOGY, CHEMISTS
    - REVIEW, 6519
  - ETHER, BIS(CHLOROMETHYL)-
    - REVIEW, 6035*
  - ETHYLENE, CHLORO-
    - REVIEW, 6035*
  - GENETICS
    - REVIEW, 6116*
    - STATISTICAL ANALYSIS, 6425
  - GLYCOPROTEINS
    - ANTIGENIC DETERMINANTS, REVIEW, 6026
  - GLYCOSPHINGOLIPIDS
    - ANTIGENIC DETERMINANTS, REVIEW, 6026
  - GROWTH SUBSTANCES
    - VASCULARIZATION, 6397
  - HISTOCOMPATIBILITY ANTIGENS
    - IMMUNE RESPONSE, REVIEW, 6025
  - HODGKIN'S DISEASE
    - EPIDEMIOLOGY, CHEMISTS, 6518
  - HORMONES
    - MUTATION, 6116*
  - IATROGENIC DISEASE
    - REVIEW, 6037*
  - LYMPHOCYTES
    - CELLS, CULTURED, REVIEW, 6097*
  - LYMPHOMA
    - EPIDEMIOLOGY, CHEMISTS, 6518
  - MUTATION
    - REVIEW, 6116*
  - OCCUPATIONAL HAZARD
    - 4-BIPHENYLAMINE, 6051*
    - CHROMIUM, 6051*
    - ETHYLENE, CHLORO-, 6051*
    - NICKEL, 6051*
    - RADIUM, 6051*
    - REVIEW, 6051*
    - URANIUM, 6051*
  - ONCOGENIC VIRUSES
    - EPIDEMIOLOGY, REVIEW, 6082*
  - PRECANCEROUS CONDITIONS
    - REVIEW, 6116*
  - SMOKING
    - REVIEW, 6037*
  - TRANSPLANTATION, HETEROLOGOUS
    - DRUG THERAPY, 6376
  - ZINC
    - METABOLISM, REVIEW, 6063*

- NEOPLASMS, MULTIPLE PRIMARY
  - ARTHRITIS, RHEUMATOID
    - CASE REPORT, 6395
  - CARCINOMA
    - PREDNISONE, 6395
    - PURINE, 6-((1-METHYL-4-NITROIMIDAZOL-5-YL)THIO)-, 6395
  - COLONIC NEOPLASMS
    - CELLULAR INCLUSIONS, 6479*
  - GENETICS
    - SOFT TISSUE TUMORS, REVIEW, 6114*
  - HEART NEOPLASMS
    - UREA, ETHYL NITROSO-, 6159
    - UREA, METHYL NITROSO-, 6159
  - MELANOMA
    - BREAST NEOPLASMS, 6406
    - CASE REPORT, 6407
    - HODGKIN'S DISEASE, 6406
    - INTESTINAL NEOPLASMS, 6406
    - LEUKEMIA, 6406
    - OVARIAN NEOPLASMS, 6406
    - SARCOMA, 6406
  - NEUROMA
    - CASE REPORT, CHILD, 6439*
  - PANCREATIC NEOPLASMS
    - CELLULAR INCLUSIONS, 6479*
  - PREDNISONE
    - CASE REPORT, 6395
  - PURINE, 6-((1-METHYL-4-NITROIMIDAZOL-5-YL)THIO)-
    - CASE REPORT, 6395
  - SARCOMA, RETICULUM CELL
    - GENETICS, 6418
    - PREDNISONE, 6395
    - PURINE, 6-((1-METHYL-4-NITROIMIDAZOL-5-YL)THIO)-, 6395
  - UTERINE NEOPLASMS
    - LIPOMATOSIS, 6476*

- NEOPLASMS, MUSCLE TISSUE
  - RHABDOMYOSARCOMA
    - RETRONECINE, 3,8-DIDEHYDRO-, 6213*

- NEOPLASMS, RADIATION-INDUCED
  - RADIATION, IONIZING
    - RISK BENEFIT STUDY, REVIEW, 6013
  - RADIOISOTOPES
    - RISK BENEFIT STUDY, REVIEW, 6013

- NEOPLASTIC ENDOCRINE-LIKE SYNDROMES
  - THYROID NEOPLASMS
    - CASE REPORT, CHILD, 6439*

- NEPHRITIS, INTERSTITIAL
  - EOSINOPHILS
    - CASE REPORT, 6458*
  - GRANULOMA
    - CASE REPORT, 6458*
  - LYMPHATIC NEOPLASMS
    - GRANULOMA, 6458*
  - UVEITIS
    - CASE REPORT, 6458*

- NEPHROBLASTOMA
  - GENETICS
    - PRECANCEROUS CONDITIONS, 6116*
  - INFANT, NEWBORN
    - CASE REPORT, 6445*
    - DIAGNOSIS AND TREATMENT, 6445*

- NERVOUS SYSTEM NEOPLASMS
  - ADENOMATOSIS, FAMILIAL ENDOCRINE
    - AUTOSOME ABNORMALITIES, REVIEW, 6117*
  - ALKYLATING AGENTS
    - NEOPLASM TRANSPLANTATION, 6053*
    - REVIEW, 6053*
  - ANGIOMATOSIS
    - AUTOSOME ABNORMALITIES, REVIEW, 6117*
  - GLIOMA
    - AUTOSOME ABNORMALITIES, REVIEW, 6117*
  - GORLIN'S SYNDROME
    - AUTOSOME ABNORMALITIES, REVIEW, 6117*
  - LEUKEMIA

- CHILD, REVIEW, 6127*
- NEOPLASM METASTASIS, REVIEW, 6127*

- MENINGES
  - NEOPLASM METASTASIS, 6460*
- METHANESULFONIC ACID, METHYL ESTER
  - NEOPLASM TRANSPLANTATION, 6053*
  - REVIEW, 6053*
- NEUROFIBROMATOSIS
  - AUTOSOME ABNORMALITIES, REVIEW, 6117*
- RETINOBLASTOMA
  - AUTOSOME ABNORMALITIES, REVIEW, 6117*
- TUBEROUS SCLEROSIS
  - AUTOSOME ABNORMALITIES, REVIEW, 6117*
- UREA, ETHYL NITROSO-
  - NEOPLASM TRANSPLANTATION, 6053*
  - REVIEW, 6053*
- UREA, METHYL NITROSO-
  - NEOPLASM TRANSPLANTATION, 6053*
  - REVIEW, 6053*

NEURILEMMOMA
- EPIDEMIOLOGY
  - PARAGUAY, 6493

NEUROBLASTOMA
- ANTIGENIC DETERMINANTS
  - IMMUNE RESPONSE, REVIEW, 6095*
- ANTIGENS, NEOPLASM
  - IMMUNITY, CELLULAR, REVIEW, 6095*
- CELL DIFFERENTIATION
  - ANTIGENS, 6347
- CELL MEMBRANE
  - ANTIGENS, 6347
- IGG
  - BINDING, CLONAL VARIATION, 6347

NEUROEPITHELIOMA
- NASOPHARYNGEAL NEOPLASMS
  - DIETHYLAMINE, N-NITROSO-, 6160

NEUROFIBROMA
- FACIAL NEOPLASMS
  - WOUNDS AND INJURIES, 6396
- NEOPLASM TRANSPLANTATION
  - C-TYPE PARTICLES, 6302

NEUROFIBROMATOSIS
- GENETICS
  - CASE REPORT, 6441*
- NEOPLASMS, CONNECTIVE TISSUE
  - EPIDEMIOLOGY, 6441*
  - SARCOMA, 6441*
- NERVOUS SYSTEM NEOPLASMS
  - AUTOSOME ABNORMALITIES, REVIEW, 6117*
- OVARIAN NEOPLASMS
  - EPIDEMIOLOGY, 6441*
  - TERATOID TUMOR, 6441*
- THORACIC NEOPLASMS
  - EPIDEMIOLOGY, 6441*
  - GANGLIONEUROMA, 6441*

NEUROMA
- NEOPLASMS, MULTIPLE PRIMARY
  - CASE REPORT, CHILD, 6439*

NEUTRAL RED
- PHENOL, 2,4-DINITRO-
  - GRANULE DEPOSITION, 6188*

NEUTRONS
- ANEMIA, HEMOLYTIC
  - DNA REPAIR, SPLEEN, 6238
- HODGKIN'S DISEASE
  - DNA REPAIR, SPLEEN, 6238
- RADIATION, IONIZING
  - RADIOTHERAPY, TECHNIQUE, 6246*

NEUTROPHILS
- LEUKEMIA, MYELOBLASTIC
  - CELL DIFFERENTIATION, 6563
  - PEROXIDASES, 6563
  - ULTRASTRUCTURAL STUDY, 6563
- LEUKEMIA, MYELOCYTIC
  - ULTRASTRUCTURAL STUDY, 6457*

NEVUS
- LYMPHATIC NEOPLASMS
  - ULTRASTRUCTURAL STUDY, 6440*

NEVUS, PIGMENTED
- COLLAGEN
  - HISTOLOGICAL STUDY, 6403
- LYMPHOKINES
  - MACROPHAGE MEMBRANE POTENTIAL, 6370
- NEOPLASMS, CONNECTIVE TISSUE
  - HISTOLOGICAL STUDY, 6403

NICKEL
- ANIMALS, LABORATORY
  - CARCINOGENIC ACTIVITY, REVIEW, 6006
- NEOPLASMS
  - OCCUPATIONAL HAZARD, 6051*
- RESPIRATORY TRACT NEOPLASMS
  - EPIDEMIOLOGY, REVIEW, 6006
- VIRUS, AVIAN MYELOBLASTOSIS
  - DNA NUCLEOTIDYLTRANSFERASES, 6578

NICOTINE
- SKIN NEOPLASMS
  - CARCINOMA, 6176*
  - PAPILLOMA, 6176*

NITROSAMINES
- MICROSOMES
  - MUTAGENIC ACTIVITY, 6138
- SALMONELLA TYPHIMURIUM
  - MUTAGENIC ACTIVITY, 6138

NITROUS ACID
- FOOD
  - CONCENTRATION LEVEL, 6165
- PYRROLIDINE, 1-NITROSO-
  - BACON, FRIED, 6536*
  - FOOD CONTAMINATION, 6536*

NOSE NEOPLASMS
- ADENOCARCINOMA
  - OCCUPATIONAL HAZARD, REVIEW, 6001
- CARCINOMA
  - ANIMALS, DOMESTIC, 6433
- CARCINOMA, EPIDERMOID
  - OCCUPATIONAL HAZARD, REVIEW, 6001

- DOGS
  - DIAGNOSIS AND PROGNOSIS, 6433
  - EPIDEMIOLOGY, 6433
  - HISTOLOGICAL STUDY, 6433
- DUST
  - OCCUPATIONAL HAZARD, REVIEW, 6001
- SARCOMA
  - ANIMALS, DOMESTIC, 6433
- WOOD
  - OCCUPATIONAL HAZARD, REVIEW, 6001

UCLEIC ACIDS
- LASERS
  - HYDROGEN BONDS, 6269*
- ULTRAVIOLET RAYS
  - HYDROGEN BONDS, 6269*
- AFLATOXIN B1
  - LIVER, RAT, 6140
- ARSENIC ACID, DISODIUM SALT
  - LYMPHOCYTES, 6547
  - THYMIDINE INCORPORATION, 6547

UCLEOPROTEINS
- ULTRAVIOLET RAYS
  - ANTIBODIES, 6254*
- VIRUS, SV40
  - DNA, CIRCULAR, 6305
  - GUANIDINE, 6305
  - HYDROCHLORIC ACID, 6305
  - ISOLATION AND CHARACTERIZATION, 6305
  - RNA POLYMERASE, 6301
  - RNA REPLICATION, 6301
  - THREITOL, 1,4-DITHIO-, 6305
  - ULTRASTRUCTURAL STUDY, 6305

UCLEOTIDES
- NEOPLASMS, EXPERIMENTAL
  - RNA, 6553

CCUPATIONAL HAZARD
- BLADDER NEOPLASMS
  - EPIDEMIOLOGY, REVIEW, 6003
- ENVIRONMENTAL HAZARD
  - REVIEW, 6054*
- ETHYLENE, CHLORO-
  - CARCINOGENIC POTENTIAL, REVIEW, 6005
- ETHYLENE, CHLORO- POLYMER
  - EPIDEMIOLOGY, REVIEW, 6052*
- LUNG NEOPLASMS
  - EPIDEMIOLOGY, REVIEW, 6050*
- MOUTH NEOPLASMS
  - CARCINOMA, EPIDERMOID, 6530*
- NEOPLASMS
  - 4-BIPHENYLAMINE, 6051*
  - CHROMIUM, 6051*
  - ETHYLENE, CHLORO-, 6051*
  - NICKEL, 6051*
  - RADIUM, 6051*
  - REVIEW, 6051*
  - URANIUM, 6051*
- PHARYNGEAL NEOPLASMS
  - CARCINOMA, EPIDERMOID, 6530*
- RESPIRATORY TRACT NEOPLASMS
  - ARSENIC, 6048*
  - EPIDEMIOLOGY, REVIEW, 6003
  - MASONS, 6515

ONCOGENIC VIRUSES
- ANTIGENIC DETERMINANTS
  - REVIEW, 6022
- CELL TRANSFORMATION, NEOPLASTIC
  - REVIEW, 6084*
- COMPLEMENT
  - VIRUS REPLICATION, 6282
- DNA, VIRAL
  - REVIEW, 6084*
- IMMUNE RESPONSE
  - REVIEW, 6022
- INTERFERON
  - ISOLATION AND CHARACTERIZATION, MOUSE, 6079*
- MOLECULAR BIOLOGY
  - REVIEW, 6022
- NEOPLASMS
  - EPIDEMIOLOGY, REVIEW, 6082*
- REVERSE TRANSCRIPTASE
  - SERUM, HUMAN, 6282
- ULTRASTRUCTURAL STUDY
  - REVIEW, 6021

ORGAN CULTURE
- NEOPLASM TRANSPLANTATION
  - CHICK EMBRYO, 6540
  - NEOPLASM METASTASIS, 6540

OROTIC ACID
- NEOPLASMS, EXPERIMENTAL
  - RNA, 6554

OSTEOGENESIS
- HELA CELLS
  - CORTISONE, 6428
  - MOUSE, NUDE, 6428
- VIRUS, SV40
  - HYBRID CELLS, 6428

OUABAIN
- TRANSFERASES
  - CELL TRANSFORMATION, NEOPLASTIC, 6338*
  - CELLS, CULTURED, 6338*

OVARIAN NEOPLASMS
- ADENOCARCINOMA
  - IMMUNE RESPONSE, NEWBORN AND ADULT MOUSE, 6377
- ARRHENOBLASTOMA
  - EPIDEMIOLOGY, REVIEW, 6112*
- GENETICS
  - EPIDEMIOLOGY, REVIEW, 6113*
- GRANULOSA CELL TUMOR
  - EPIDEMIOLOGY, REVIEW, 6112*
- GYNANDROBLASTOMA
  - EPIDEMIOLOGY, REVIEW, 6112*
- HORMONES
  - NEOPLASMS, EXPERIMENTAL, REVIEW, 6047*
- LEYDIG CELL TUMOR
  - EPIDEMIOLOGY, REVIEW, 6112*
- MELANOMA
  - NEOPLASMS, MULTIPLE PRIMARY, 6406
- NEUROFIBROMATOSIS
  - EPIDEMIOLOGY, 6441*
- PREGNANCY
  - EPIDEMIOLOGY, REVIEW, 6112*
- RADIATION, IONIZING

- DOSE-RESPONSE STUDY, MOUSE, 6265*
- STEROIDS
  - EPIDEMIOLOGY, REVIEW, 6112*
- TERATOID TUMOR
  - NEOPLASM TRANSPLANTATION, 6489*
  - NEUROFIBROMATOSIS, 6441*
- THECA CELL TUMOR
  - EPIDEMIOLOGY, REVIEW, 6112*
- TRANSPLANTATION IMMUNOLOGY
  - NEOPLASM TRANSPLANTATION, 6377

1,2-OXATHIANE, 2,2-DIOXIDE
- ASCOMYCETES
  - MUTAGENIC ACTIVITY, 6217*
- NUCLEOPHILES
  - REACTION KINETICS, 6217*

1,2-OXATHIOLANE, 2,2-DIOXIDE
- ASCOMYCETES
  - MUTAGENIC ACTIVITY, 6217*
- CHROMOSOMES
  - CELL TRANSFORMATION, NEOPLASTIC, REVIEW, 6120*
- LYMPHATIC NEOPLASMS
  - CARCINOGENIC POTENTIAL, MOUSE, 6223*
- NUCLEOPHILES
  - REACTION KINETICS, 6217*
- SKIN NEOPLASMS
  - CARCINOGENIC POTENTIAL, MOUSE, 6223*

OXIDATIVE PHOSPHORYLATION
- ANILINE, N,N-DIMETHYL-P-PHENYLAZO-
  - DIETHYLAMINE, N-NITROSO-, 6181*
  - RADIATION, IONIZING, 6181*
- HEPATOMA
  - DIETHYLAMINE, N-NITROSO-, 6181*
  - RADIATION, IONIZING, 6181*
- L CELLS
  - UNCOUPLING AGENTS, 6188*

OXIDOREDUCTASES
- BENZO(A)PYRENE
  - CARCINOGENIC METABOLITE, 6145
  - DIOL EPOXIDES, 6145
  - LIVER, 6199*
  - LYMPHOCYTES, 6199*
- CARCINOGEN, CHEMICAL
  - REVIEW, 6042*
- DIMETHYLAMINE, N-NITROSO-
  - AROCLOR 1254, 6182*
  - BARBITURIC ACID, 5-ETHYL-5-PHENYL-, 6182*
  - CHOLANTHRENE, 3-METHYL-, 6182*
  - CYTOCHROMES, 6182*
- 2-NAPHTHYLAMINE
  - MICROSOMES, LIVER, 6186*
- QUINOLINE, 4-(HYDROXYAMINO)-, 1-OXIDE
  - REVIEW, 6042*
- QUINOLINE, 4-NITRO-, 1-OXIDE
  - REVIEW, 6042*
- UREA, ETHYL NITROSO-
  - REVIEW, 6042*
- UREA, METHYL NITROSO-
  - REVIEW, 6042*

OXYGEN
- CARCINOMA, EPIDERMOID
  - RADIOTHERAPY, 6275*
- CYTOCHROME OXIDASE
  - CELL TRANSFORMATION, NEOPLASTIC, 6584*

OXYGENASES
- BENZ(A)ANTHRACENE
  - MUTAGENIC ACTIVITY, 6204*
- BENZ(A)ANTHRACENE, 3,4-DIOL
  - MUTAGENIC ACTIVITY, 6204*
- BENZ(A)ANTHRACENE, 8,9-DIOL
  - MUTAGENIC ACTIVITY, 6204*

OZONE
- AIR POLLUTION
  - CARCINOGENIC POTENTIAL, 6062*

PALATAL NEOPLASMS
- FIBROSARCOMA
  - IMMUNITY, CELLULAR, 6367

PANCREAS
- BRAIN DISEASES
  - ULTRASTRUCTURAL STUDY, 6443*
- COLONIC NEOPLASMS
  - CELLULAR INCLUSIONS, 6479*

PANCREATIC NEOPLASMS
- BLOOD GROUPS
  - EPIDEMIOLOGY, 6510
- HORMONES
  - NEOPLASMS, EXPERIMENTAL, REVIEW, 6047*
- ISLET CELL TUMOR
  - CELLULAR INCLUSIONS, 6479*
- NEOPLASMS, MULTIPLE PRIMARY
  - CELLULAR INCLUSIONS, 6479*
- RIBONUCLEASE
  - SERUM LEVELS, 6556

PANCREATITIS
- RIBONUCLEASE
  - SERUM LEVELS, 6556

PAPILLOMA
- DIGESTIVE SYSTEM NEOPLASMS
  - EPIDEMIOLOGY, HAMSTER, 6432
- EELS
  - ISOLATION AND CHARACTERIZATION, 6325*
- ETHANOL, 2,2',2''-NITRILOTRIS-
  - CO-CARCINOGENIC ACTIVITY, 6155
- FISHES
  - JAPAN, 6334*
  - ULTRASTRUCTURAL STUDY, 6334*
  - VIRUS-LIKE PARTICLES, 6334*
- LARYNGEAL NEOPLASMS
  - DIETHYLAMINE, N-NITROSO-, 6179*
- MOUTH NEOPLASMS
  - WHITE CROAKER, 6523*
- SKIN NEOPLASMS
  - NICOTINE, 6176*
- VIRUS-LIKE PARTICLES
  - ULTRASTRUCTURAL STUDY, EEL, 6325*

PARANASAL SINUS NEOPLASMS
- CARCINOMA
  - ANIMALS, DOMESTIC, 6433
- DOGS

        ANIMALS, DOMESTIC, 6433
        DIAGNOSIS AND PROGNOSIS, 6433
        EPIDEMIOLOGY, 6433
        HISTOLOGICAL STUDY, 6433

PARATHYROID HORMONE
    SARCOMA, OSTEOGENIC
        ADENOSINE CYCLIC 3',5'
          MONOPHOSPHATE, 6567
        PHOSPHATE, 6567

PARATHYROID NEOPLASMS
    HORMONES
        NEOPLASMS, EXPERIMENTAL, REVIEW,
          6047*

PAROTID GLAND
    LUPUS ERYTHEMATOSUS, SYSTEMIC
        CELLULAR INCLUSIONS, 6479*
        ULTRASTRUCTURAL STUDY, 6443*

PEANUT OIL
    HEPATOMA
        HISTOLOGICAL STUDY, MOUSE, 6143
        PRECANCEROUS CONDITIONS, 6143

PENILE NEOPLASMS
    CARCINOMA, EPIDERMOID
        EPIDEMIOLOGY, INDIA, 6494

PENTOSYLTRANSFERASES
    HEPATOMA
        ENZYMATIC ACTIVITY, 6562

PEPTIC ULCER
    STOMACH NEOPLASMS
        EPIDEMIOLOGY, 6534*

PEPTIDE HYDROLASES
    CELL MEMBRANE
        CELL TRANSFORMATION, NEOPLASTIC,
          REVIEW, 6136*
    CONCANAVALIN A
        AGGLUTINATION, 6593*
    FIBROBLASTS
        AGGLUTINATION, 6593*
        CELL DIVISION, 6593*
    HEPATOMA
        DEXAMETHASONE, 6594*

PEPTIDES
    VIRAL PROTEINS
        ISOLATION AND CHARACTERIZATION,
          6023
    VIRUS, HERPES SIMPLEX 1
        CARCINOGENIC POTENTIAL, 6083*
        ISOLATION AND CHARACTERIZATION,
          REVIEW, 6083*
    VIRUS, HERPES SIMPLEX 2
        ZINC SULFATE, 6316
    VIRUS, MENGO
        AMINO ACIDS, 6326*
        ISOLATION AND CHARACTERIZATION,
          6326*

PERIODIC ACID
    VIRUS, ROUS SARCOMA
        GLYCOPROTEINS, 6279

PERITONEAL NEOPLASMS
    ASBESTOS
        CASE REPORT, 6466*

PEROXIDASES
    ACETIC ACID, (2,4-DICHLOROPHENOXY)-
        RNA, BINDING, 6177*
    CELL MEMBRANE
        IODOPROTEINS, 6134*
    HEPATOMA
        CELL CYCLE KINETICS, 6587*
    INDOLE-3-ACETIC ACID
        RNA, BINDING, 6177*
    LEUKEMIA, MYELOBLASTIC
        AZUROPHILS, 6563
        NEUTROPHILS, 6563
    VIRUS, ROUS SARCOMA
        GLYCOPROTEINS, 6279

PEROXYFORMIC ACID
    CARCINOEMBRYONIC ANTIGEN
        ANTIGEN-ANTIBODY REACTIONS, 6348

PERSONALITY ASSESSMENT
    BREAST NEOPLASMS
        EMOTIONS, 6499

PERSONALITY DISORDERS
    LUNG NEOPLASMS
        ANXIETY, 6531*

PETROLEUM
    SKIN NEOPLASMS
        OCCUPATIONAL HAZARD, REVIEW, 6004

PHAGOCYTOSIS
    HODGKIN'S DISEASE
        MACROPHAGES, 6365

PHARYNGEAL NEOPLASMS
    CARCINOMA, EPIDERMOID
        OCCUPATIONAL HAZARD, 6530*
    TEXTILE INDUSTRY
        EPIDEMIOLOGY, ENGLAND, 6530*

PHENANTHRENE, 9,10-EPOXY-9,10-DIHYDRO-
    LIVER
        METABOLISM, 6196*

1,10-PHENANTHROLINE
    LUNG NEOPLASMS
        NEOPLASM METASTASIS, 6416

PHENOL, 4-BROMO-2-NITRO-
    CARCINOEMBRYONIC ANTIGEN
        ANTIGEN-ANTIBODY REACTIONS, 6348

PHENOL, (1,1-DIMETHYLETHYL)-4-METHOXY-
    BENZO(A)PYRENE
        ARYL HYDROCARBON HYDROXYLASES,
          6146
        CYTOCHROME P-450, 6146
        MICROSOMES, LIVER, 6146
    7,8-BENZOFLAVONE
        ARYL HYDROCARBON HYDROXYLASES,
          6146

PHENOL, 2,4-DINITRO-
    AFLATOXIN B1

- ACETATE INCORPORATION, 6168*
- L CELLS
  - GRANULE DEPOSITION, 6188*
- NEUTRAL RED
  - GRANULE DEPOSITION, 6188*
- PLASMACYTOMA
  - IMMUNOGLOBULINS, LIGHT CHAIN, 6352

PHENOL, 2-METHOXY-
- FOOD CONTAMINATION
  - REVIEW, 6056*

PHORBOL MYRISTATE ACETATE
- SEE 12-O-TETRADECANOYLPHORBOL-13-ACETATE

PHOSPHATASES
- VIRUS, GRAFFI MURINE LEUKEMIA
  - CELL TRANSFORMATION, NEOPLASTIC, 6454*
  - ULTRASTRUCTURAL STUDY, 6454*
- VIRUS, RAUSCHER MURINE LEUKEMIA
  - CELL TRANSFORMATION, NEOPLASTIC, 6454*
  - ULTRASTRUCTURAL STUDY, 6454*

PHOSPHATE
- SARCOMA, OSTEOGENIC
  - ADENOSINE CYCLIC 3',5' MONOPHOSPHATE, 6567
  - PARATHYROID HORMONE, 6567

PHOSPHOGLUCONATE DEHYDROGENASE
- CARCINOMA, BASAL CELL
  - ENZYMATIC ACTIVITY, 6599*
- CARCINOMA, EPIDERMOID
  - ENZYMATIC ACTIVITY, 6599*
- KERATOACANTHOMA
  - ENZYMATIC ACTIVITY, 6599*
- SEBORRHEA
  - ENZYMATIC ACTIVITY, 6599*

PHOSPHOGLYCERATE KINASE
- CARCINOMA, BASAL CELL
  - FLUOROMETRY, 6586*
- CARCINOMA, EPIDERMOID
  - FLUOROMETRY, 6586*
- KERATOACANTHOMA
  - FLUOROMETRY, 6586*
- WARTS
  - FLUOROMETRY, 6586*

PHOSPHOGLYCEROMUTASE
- CARCINOMA, BASAL CELL
  - FLUOROMETRY, 6586*
- CARCINOMA, EPIDERMOID
  - FLUOROMETRY, 6586*
- KERATOACANTHOMA
  - FLUOROMETRY, 6586*
- WARTS
  - FLUOROMETRY, 6586*

PHOSPHOLIPIDS
- ACETAMIDE, THIO-
  - LIVER, 6183*
  - MICROSOMES, LIVER, 6183*
  - MITOCHONDRIA, LIVER, 6183*
  - SILYMARIN, 6183*
- CARCINOMA, EHRLICH TUMOR
  - MICROSOMES, 6598*
  - MITOCHONDRIA, 6598*
  - TEMPERATURE, 6598*
- VIRUS, ROUS SARCOMA
  - ACYL GROUP COMPOSITION, 6281
  - CELL MEMBRANE, 6281
  - CELL TRANSFORMATION, NEOPLASTIC, 6281

PHOSPHOPROTEINS
- VIRUS, SV40
  - CELL TRANSFORMATION, NEOPLASTIC, 6589*

PHOSPHOPYRUVATE HYDRATASE
- CARCINOMA, BASAL CELL
  - FLUOROMETRY, 6586*
- CARCINOMA, EPIDERMOID
  - FLUOROMETRY, 6586*
- KERATOACANTHOMA
  - FLUOROMETRY, 6586*
- WARTS
  - FLUOROMETRY, 6586*

PHOSPHOROTHIOIC ACID, O,O-DIETHYL O-(P-NITROPHENYL) ESTER
- FORMAMIDINE, N'-(4-CHLORO-O-TOLYL)-N,N-DIMETHYL-
  - RETENTION, 6216*

PHOSPHORUS
- BONE NEOPLASMS
  - METABOLISM, REVIEW, 6103*

PHOSPHOTRANSFERASES
- HEPATOMA
  - ENZYMATIC ACTIVITY, 6562
  - MITOCHONDRIA, 6581*

PHYTOHEMAGGLUTININ
- SEE PLANT AGGLUTININS

PIGMENTATION
- ERYTHEMIA
  - ULTRAVIOLET RAYS, 6266*
- MELANOMA
  - THYMINE DIMERS, 6236

2,6-PIPERAZINEDIONE, 4,4'-PROPYLENEDI-
- CLOSTRIDIOPEPTIDASE A
  - NEOPLASM METASTASIS, 6416
- LUNG NEOPLASMS
  - NEOPLASM METASTASIS, 6416
- MELANOMA
  - CATHEPSIN, 6416

PIPERONYL ALCOHOL, ALPHA-VINYL-
- CARCINOGENIC METABOLITE
  - REVIEW, 6040*

PITUITARY HORMONES
- HYPERTENSION
  - RESERPINE, 6229*

PITUITARY NEOPLASMS
- ACROMEGALY
  - EPIDEMIOLOGY, REVIEW, 6101*
- ADENOMA, CHROMOPHOBE
  - EPIDEMIOLOGY, REVIEW, 6101*

- ADENOMA, EOSINOPHILIC
  - EPIDEMIOLOGY, REVIEW, 6101*
- CRANIOPHARYNGIOMA
  - EPIDEMIOLOGY, REVIEW, 6101*
- CUSHING'S SYNDROME
  - EPIDEMIOLOGY, REVIEW, 6101*
- HORMONES
  - NEOPLASMS, EXPERIMENTAL, REVIEW, 6047*
- HYPERTHYROIDISM
  - EPIDEMIOLOGY, REVIEW, 6101*
- SOMATOTROPIN
  - METABOLISM, REVIEW, 6101*

LACENTA
- BENZO(A)PYRENE
  - METABOLSIM, 6196*
- COUMARIN, 7-ETHOXY-
  - METABOLSIM, 6196*

LACENTAL LACTOGEN
- UTERINE NEOPLASMS
  - SERUM LEVELS, REVIEW, 6110*

LANT AGGLUTININS
- ERYTHROLEUKEMIA
  - BLOOD GROUPS, 6413
  - CASE REPORT, 6413
- HEPATOMA
  - LYMPHOCYTE TRANSFORMATION, 6366
- LEUKEMIA, MYELOBLASTIC
  - BLOOD GROUPS, 6412
  - CASE REPORT, 6412
- LEUKEMIA, MYELOCYTIC
  - CHROMOSOME ABERRATIONS, 6419
- B-LYMPHOCYTES
  - IMMUNE RESPONSE, AKR MICE, 6360
- T-LYMPHOCYTES
  - IMMUNE RESPONSE, AKR MICE, 6360
- MYELOPROLIFERATIVE DISORDERS
  - CHROMOSOME ABERRATIONS, 6419
- SARCOMA
  - BINDING, 6570

LANT TUMORS
- AGROBACTERIUM TUMEFACIENS
  - DNA, BACTERIAL, 6169*
  - DNA-DNA HYBRIDIZATION, 6169*
- DNA, BACTERIAL
  - EXTRACHROMOSOMAL INHERITANCE, 6169*
- PLANT GROWTH REGULATORS
  - ISOLATION AND CHARACTERIZATION, VINCA ROSEA, 6522
- PURINES
  - CELL DIVISION, 6522

PLASMA CELLS
- AGAMMAGLOBULINEMIA
  - T-LYMPHOCYTES, 6350
- HEAVY CHAIN DISEASE
  - CELLULAR INCLUSIONS, 6364
- MACROGLOBULINEMIA
  - CELLULAR INCLUSIONS, 6364
- MULTIPLE MYELOMA
  - CELLULAR INCLUSIONS, 6364

PLASMACYTOMA
- CHROMOSOME ABERRATIONS
  - G-BANDING, 6423
- IGA
  - IMMUNOGLOBULINS, HEAVY CHAIN, 6352
  - IMMUNOGLOBULINS, LIGHT CHAIN, 6352
- IMMUNOGLOBULINS, LIGHT CHAIN
  - BINDING, 6352
  - LYSINE, 6352
  - PHENOL, 2,4-DINITRO-, 6352
- KARYOTYPING
  - G-BANDING, 6423

PLASMINOGEN
- RNA REPLICATION
  - CELL TRANSFORMATION, NEOPLASTIC, 6590*
- STEROIDS
  - LUNG, EMBRYO, 6590*
- VIRUS, ROUS SARCOMA
  - ACTINOMYCIN, 6590*
  - CELL TRANSFORMATION, NEOPLASTIC, 6590*
  - CYCLOHEXIMIDE, 6590*
  - RNA REPLICATION, 6590*

PLATINUM, DIAMINEDICHLORO-
- CAFFEINE
  - DNA REPAIR, 6222*

PLUTONIUM
- RADIATION INJURIES, EXPERIMENTAL
  - METABOLISM, TESTES, MOUSE, 6242*
  - RADIATION EFFECTS, FISH EGGS, 6244*
- RADIOBIOLOGY
  - REVIEW, 6071*

PLUTONIUM OXIDE
- ALPHA PARTICLES
  - CARCINOGENIC POTENTIAL, REVIEW, 6074*
- ENVIRONMENTAL HAZARD
  - DOSE-RESPONSE STUDY, REVIEW, 6074*

POLY A
- ESCHERICHIA COLI
  - RNA, RIBOSOMAL, 6555
- RIBONUCLEASE
  - HYDROLYSIS, 6555
- RNA
  - HYDROLYSIS, 6555
- RNA, MESSENGER
  - RIBONUCLEASE, 6555
- RNA, RIBOSOMAL
  - RIBONUCLEASE, 6555
- VIRUS, MOLONEY MURINE SARCOMA-LEUKEMIA
  - RNA, VIRAL, 6289

POLYCYCLIC HYDROCARBONS
- CELL TRANSFORMATION, NEOPLASTIC
  - PHOTONS, ABSORPTION AND REEMISSION, 6269*
- TESTICULAR NEOPLASMS
  - OCCUPATIONAL HAZARD, REVIEW, 6004
- ULTRAVIOLET RAYS
  - PHOTONS, ABSORPTION AND REEMISSION, 6269*

POLYCYTHEMIA VERA
- LEUKEMIA, RADIATION-INDUCED

- EPIDEMIOLOGY, REVIEW, 6012

POLYPLOIDY
- ERYTHROLEUKEMIA
  - BONE MARROW, 6449*
- LEUKEMIA
  - PRECANCEROUS CONDITIONS, 6449*
- LEUKEMIA, MYELOBLASTIC
  - BONE MARROW, 6449*
- LEUKEMIA, MYELOCYTIC
  - BONE MARROW, 6449*

POLYPS
- BLADDER NEOPLASMS
  - CYSTISIS, 6450*
- COLONIC NEOPLASMS
  - CHILD, 6470*
  - DNA REPLICATION, 6552
  - GENETICS, 6470*, 6552
  - PRECANCEROUS CONDITIONS, 6552
  - THYMIDINE INCORPORATION, 6552
- GASTROINTESTINAL NEOPLASMS
  - GENETICS, 6469*, 6471*
- INTESTINAL NEOPLASMS
  - GENETICS, 6468*
  - SURGERY, OPERATIVE, 6468*

POLYRIBONUCLEOTIDES
- VIRUS, AVIAN MYELOBLASTOSIS
  - REVERSE TRANSCRIPTASE, 6323*

PRECANCEROUS CONDITIONS
- BLADDER NEOPLASMS
  - CLASSIFICATION, 6123*
- BREAST NEOPLASMS
  - CLASSIFICATION, 6496
  - EMOTIONS, 6499
  - NEOPLASM RECURRENCE, LOCAL, 6496
  - RADIATION, IONIZING, 6076*
- CARCINOGEN, CHEMICAL
  - REVIEW, 6044*
- CERVIX NEOPLASMS
  - CELL DIFFERENTIATION, REVIEW, 6123*
  - CONTRACEPTIVES, ORAL, 6152
  - EPIDEMIOLOGY, REVIEW, 6085*
  - ULTRASTRUCTURAL STUDY, 6477*
- CLASSIFICATION
  - CELL DIFFERENTIATION, REVIEW, 6123*
- COLONIC NEOPLASMS
  - CELL DIFFERENTIATION, REVIEW, 6123*
  - POLYPS, 6552
- HEPATOMA
  - FOOD ADDITIVES, 6143
  - PEANUT OIL, 6143
- LEUKEMIA
  - POLYPLOIDY, 6449*
- LEUKEMIA, MYELOCYTIC
  - CASE REPORT, 6419
- LIVER NEOPLASMS
  - CYCLOHEXANE, 1,2,3,4,5,6-HEXACHLORO-, ALPHA-ISOMER, 6158
- MOUTH NEOPLASMS
  - CARCINOMA, EPIDERMOID, 6124*
  - LEUKOPLAKIA, 6124*
- NEOPLASMS
  - REVIEW, 6116*
- NEOPLASMS, EXPERIMENTAL
  - ULTRASTRUCTURAL STUDY, REVIEW, 6123*
- NEPHROBLASTOMA
  - GENETICS, 6116*
- PROSTATIC NEOPLASMS
  - DNA NUCLEOTIDYLTRANSFERASES, 6320
- RESPIRATORY TRACT NEOPLASMS
  - ANIMAL MODEL, RAT, 6174*
  - SMOKING, 6174*
- RETINOBLASTOMA
  - GENETICS, 6116*
- SKIN NEOPLASMS
  - ULTRAVIOLET RAYS, 6266*
- STOMACH NEOPLASMS
  - CYTODIAGNOSIS, 6447*
  - EPIDEMIOLOGY, 6529*
- VIRUS, MURINE LEUKEMIA
  - ANTIGENS, VIRAL, 6346
  - HISTOCOMPATIBILITY ANTIGENS, 6346
  - ISOANTIGENS, 6346

PREDNISONE
- NEOPLASMS, MULTIPLE PRIMARY
  - CARCINOMA, 6395
  - CASE REPORT, 6395
  - SARCOMA, RETICULUM CELL, 6395

PREGNANCY
- OVARIAN NEOPLASMS
  - EPIDEMIOLOGY, REVIEW, 6112*

PREGNENOLONE
- CORTICOTROPIN
  - CELL DIFFERENTIATION, 6566

PROLACTIN
- BREAST NEOPLASMS
  - EPIDEMIOLOGY, REVIEW, 6057*
- DIETARY FATS
  - CIRCADIAN RHYTHM, 6228*
  - LH, 6228*
- HYPERTENSION
  - RESERPINE, 6229*
- RESERPINE
  - MENOPAUSE, 6229*
  - SERUM LEVELS, 6229*

PROLINE
- FOOD
  - CONCENTRATION LEVEL, 6165
- PYRROLIDINE, 1-NITROSO-
  - PRECURSORS, 6165

PROLINE, 1-NITROSO-
- FOOD
  - CONCENTRATION LEVEL, 6165
- PYRROLIDINE, 1-NITROSO-
  - PRECURSORS, 6165

PROMETHIUM
- IRON HYDROXIDE
  - LUNG CLEARANCE, MOUSE, 6232
- SILICA
  - LUNG CLEARANCE, MOUSE, 6232

PRONASE
- FIBROBLASTS
  - AGGLUTINATION, 6593*

        - CELL DIVISION, 6593*

ROPANEDIAL
- ULTRAVIOLET RAYS
    - LIPID PEROXIDATION, SKIN, 6235

1,3-PROPANEDIOL, 2-AMINO-2-(HYDROXYMETHYL)-
- VIRUS, SV40
    - RNA REPLICATION, 6301

ROSTATE
- DOG
    - ULTRASTRUCTURAL STUDY, 6443*
- EPITHELIAL CELLS
    - ULTRASTRUCTURAL STUDY, 6443*
- NEOPLASMS, CONNECTIVE TISSUE
    - ULTRASTRUCTURAL STUDY, 6443*

ROSTATIC NEOPLASMS
- PRECANCEROUS CONDITIONS
    - DNA NUCLEOTIDYLTRANSFERASES, 6320
- VIRUS, MURINE LEUKEMIA
    - DNA-RNA HYBRIDIZATION, 6318
    - REVERSE TRANSCRIPTASE, 6318

ROSTHESIS
- MOUTH NEOPLASMS
    - CARCINOMA, BASAL CELL, 6463*

RCTEIN KINASE
- CELL CYCLE KINETICS
    - OVARY, HAMSTER, 6558
- CELL DIVISION
    - OVARY, HAMSTER, 6558
- OVARY, HAMSTER
    - CELL CYCLE KINETICS, 6558
- PUROMYCIN
    - OVARY, HAMSTER, 6558
- VIRUS, SV40
    - CELL TRANSFORMATION, NEOPLASTIC, 6589*

ROTEINS
- CLOSTRIDIOPEPTIDASE A
    - CELL MEMBRANE, 6592*
    - FIBROBLASTS, 6592*
- LUNG NEOPLASMS
    - IMMUNITY, PASSIVE, 6362
- STOMACH NEOPLASMS
    - ADENOCARCINOMA, 6549
- THROMBIN
    - CELL MEMBRANE, 6592*
- TISSUE CULTURE
    - CELL CYCLE KINETICS, 6548
- TRYPSIN
    - CELL MEMBRANE, 6592*
    - FIBROBLASTS, 6592*

PROTEUS
- DIMETHYLAMINE, N-NITROSO-
    - IN VITRO PRODUCTION, 6161
    - NITRASE-POSITIVE BACTERIA, 6161

PULMONARY ALVEOLI
- SMOKING
    - MACROPHAGES, 6173*

PULMONARY FIBROSIS
- ASBESTOS
    - EPIDEMIOLOGY, REVIEW, 6050*

PULMONARY VALVE STENOSIS
- TURNER'S SYNDROME
    - CASE REPORT, 6442*

PURINE, 6-((1-METHYL-4-NITROIMIDAZOL-5-YL) THIO)-
- ARTHRITIS, RHEUMATOID
    - CARCINOGENIC POTENTIAL, 6167
- CHROMOSOME ABERRATIONS
    - ARTHRITIS, 6166
- NEOPLASMS, MULTIPLE PRIMARY
    - CARCINOMA, 6395
    - CASE REPORT, 6395
    - SARCOMA, RETICULUM CELL, 6395

PURINE-6-THIOL
- CARCINOMA, EPIDERMOID
    - ULTRAVIOLET RAYS, 6264*
- SKIN NEOPLASMS
    - ULTRAVIOLET RAYS, 6264*

PURINES
- PLANT TUMORS
    - CELL DIVISION, 6522
- ULTRAVIOLET RAYS
    - DNA, PHOTOCHEMICAL REACTIONS, REVIEW, 6077*

PUROMYCIN
- PROTEIN KINASE
    - OVARY, HAMSTER, 6558

PYRAZOLE-1-ACETAMIDE, 3,4,5-TRIBROMO-N,N, ALPHA-TRIMETHYL-
- DIET
    - CARCINOGENIC POTENTIAL, RAT, 6224*
    - MUTAGENIC POTENTIAL, RAT, 6224*
- LIVER
    - HYPERPLASIA, 6224*

3,5-PYRAZOLIDINEDIONE, 4-BUTYL-1,2-DIPHENYL-
- CHROMOSOME ABERRATIONS
    - ARTHRITIS, 6166

PYRIDINE
- BENZ(A)ANTHRACENE
    - CATIONS, RADICAL, 6200*
- BENZ(A)ANTHRACENE, 7,12-DIMETHYL-
    - CATIONS, RADICAL, 6200*
- BENZ(A)ANTHRACENE, 2-METHYL-
    - CATIONS, RADICAL, 6200*
- BENZ(A)ANTHRACENE, 5-METHYL-
    - CATIONS, RADICAL, 6200*
- BENZ(A)ANTHRACENE, 6-METHYL-
    - CATIONS, RADICAL, 6200*
- BENZ(A)ANTHRACENE, 7-METHYL-
    - CATIONS, RADICAL, 6200*
- BENZ(A)ANTHRACENE, 8-METHYL-
    - CATIONS, RADICAL, 6200*
- BENZ(A)ANTHRACENE, 11-METHYL-
    - CATIONS, RADICAL, 6200*
- BENZ(A)ANTHRACENE, 12-METHYL-
    - CATIONS, RADICAL, 6200*

PYRIDOXAL, 5-(DIHYDROGEN PHOSPHATE)

  - VIRUS, ROUS SARCOMA
    - GLYCOPROTEINS, 6279

- PYRIMIDINES
  - ULTRAVIOLET RAYS
    - ANTIBODIES, 6254*
    - DNA, PHOTOCHEMICAL REACTIONS, REVIEW, 6077*
    - DNA REPAIR, 6254*
  - VIRUS, SV40
    - ULTRAVIOLET RAYS, 6262*

- PYRROLIDINE
  - FOOD
    - CONCENTRATION LEVEL, 6165
  - PYRROLIDINE, 1-NITROSO-
    - PRECURSORS, 6165

- PYRROLIDINE, 1-NITROSO-
  - FOOD
    - CONCENTRATION LEVEL, 6165
  - NITROUS ACID
    - BACON, FRIED, 6536*
    - FOOD CONTAMINATION, 6536*
  - PROLINE
    - PRECURSORS, 6165
  - PROLINE, 1-NITROSO-
    - PRECURSORS, 6165
  - PYRROLIDINE
    - PRECURSORS, 6165

- PYRROLIZIDINE ALKALOIDS
  - LIVER NEOPLASMS
    - ANIMAL MODEL, REVIEW, 6046*

- PYRUVATE KINASE
  - CARCINOMA, BASAL CELL
    - FLUOROMETRY, 6586*
  - CARCINOMA, EPIDERMOID
    - FLUOROMETRY, 6586*
  - KERATOACANTHOMA
    - FLUOROMETRY, 6586*
  - LEUKEMIA, MYELOCYTIC
    - ERYTHROCYTES, 6456*
  - WARTS
    - FLUOROMETRY, 6586*

- QUINOLINE, 4-(HYDROXYAMINO)-, 1-OXIDE
  - OXIDOREDUCTASES
    - REVIEW, 6042*

- QUINOLINE, 4-NITRO-, 1-OXIDE
  - CHROMOSOMES
    - CELL TRANSFORMATION, NEOPLASTIC, REVIEW, 6120*
  - CONTACT INHIBITION
    - CELL TRANSFORMATION, NEOPLASTIC, 6209*
  - OXIDOREDUCTASES
    - REVIEW, 6042*
  - UREA, HYDROXY-
    - CELL TRANSFORMATION, NEOPLASTIC, 6209*
    - DNA REPAIR, 6209*

- RADIATION
  - CELL TRANSFORMATION, NEOPLASTIC
    - DOSE-RESPONSE STUDY, REVIEW, 6075*

- RADIATION CHIMERA
  - ALLOANTIGENS
    - GRAFT REJECTION, 6379*

- RADIATION INJURIES
  - CHROMOSOME ABERRATIONS
    - DOSE-RESPONSE STUDY, LYMPHOCYTES, 6234

- RADIATION INJURIES, EXPERIMENTAL
  - CELL TRANSFORMATION, NEOPLASTIC
    - RADIATION DOSAGE, HAMSTER EMBRYO, IN UTERO, 6271*
  - PLUTONIUM
    - METABOLISM, TESTES, MOUSE, 6242*
    - RADIATION EFFECTS, FISH EGGS, 6244*

- RADIATION, IONIZING
  - ADENOSINE CYCLIC 3',5' MONOPHOSPHATE
    - MICROTUBULES, 6258*
  - ALLOANTIGENS
    - GRAFT REJECTION, 6379*
  - ANEMIA, APLASTIC
    - CHROMOSOME ABERRATIONS, 6434*
  - ANEMIA, HEMOLYTIC
    - DNA REPAIR, SPLEEN, 6238
  - ANILINE, N,N-DIMETHYL-P-PHENYLAZO-
    - OXIDATIVE PHOSPHORYLATION, 6181*
  - BENZENE
    - CHROMOSOME ABERRATIONS, 6252*
  - BREAST NEOPLASMS
    - PRECANCEROUS CONDITIONS, 6076*
  - CAFFEINE
    - DNA REPAIR, 6256*
    - DOSE-RESPONSE STUDY, HAMSTER, 6256*
  - CELL TRANSFORMATION, NEOPLASTIC
    - DOSE-RESPONSE STUDY, MOUSE EMBRYO CELLS, 6263*
    - RADIATION DOSAGE, HAMSTER EMBRYO, IN UTERO, 6271*
  - CHROMATIN
    - DNA, 6268*
  - CHROMOSOME ABERRATIONS
    - DOSE-RESPONSE STUDY, LYMPHOCYTES, 6234
    - G-BANDING, 6212*
  - CHROMOSOMES
    - MUTAGENIC ACTIVITY, REVIEW, 6070*
  - COLCHICINE, N-DEACETYL-N-METHYL-
    - MICROTUBULES, 6258*
  - DEOXYRIBONUCLEASE
    - CELL NUCLEUS, 6248*
  - DNA
    - CELL NUCLEUS, 6248*
    - DNA-PROTEIN CROSS-LINKING, 6268*
    - DOSE-RESPONSE STUDY, HAMSTER, 6272*
    - GLYCEROL, 6270*
    - METHANE, SULFINYLBIS-, 6270*
    - RADIATION EFFECTS, 6259*
    - RADIATION-PROTECTIVE AGENTS, 627
  - DNA NUCLEOTIDYLTRANSFERASES
    - BINDING SITES, 6251*
  - DNA REPAIR
    - AUTORADIOGRAPHIC STUDY, 6240*
    - DOSE-RESPONSE STUDY, EYE, RABBIT, 6241*

  - RADIATION-SENSITIZING AGENTS, 6256*
  - TEMPERATURE, 6267*
- DNA, SINGLE-STRANDED
  - DNA REPAIR, 6251*
- ESCHERICHIA COLI
  - DNA REPAIR, 6251*
- EYE NEOPLASMS
  - DOSE-RESPONSE STUDY, MOUSE, 6265*
- GERM CELLS
  - MUTAGENIC ACTIVITY, REVIEW, 6069*
- GRAFT VS HOST REACTION
  - MAMMAE, 6257*
- HEPATOMA
  - CASE HISTORY, 6237
  - CHROMATIN, 6267*
  - DNA REPAIR, 6267*
  - OXIDATIVE PHOSPHORYLATION, 6181*
  - TEMPERATURE, 6267*
- HODGKIN'S DISEASE
  - DNA REPAIR, SPLEEN, 6238
- LEUKEMIA, MYELOCYTIC
  - SPLEEN, REVIEW, 6126*
- LEUKOCYTES
  - CHROMOSOME ABERRATIONS, 6252*
- LEUROCRISTINE
  - MICROTUBULES, 6258*
- LUNG
  - RISK BENEFIT STUDY, REVIEW, 6013
- LUNG NEOPLASMS
  - DOSE-RESPONSE STUDY, MOUSE, 6250*, 6265*
- T-LYMPHOCYTES
  - IMMUNITY, PASSIVE, 6345
- MYELOID METAPLASIA
  - SPLEEN, REVIEW, 6126*
- NEOPLASMS, RADIATION-INDUCED
  - RISK BENEFIT STUDY, REVIEW, 6013
- NEUTRONS
  - RADIOTHERAPY, TECHNIQUE, 6246*
- OVARIAN NEOPLASMS
  - DOSE-RESPONSE STUDY, MOUSE, 6265*
- RADIATION DOSAGE
  - RADIORESISTANCE, MOUSE, 6233
- SALIVARY GLAND NEOPLASMS
  - CARCINOMA, 6274*
  - CASE REPORT, 6274*
  - NEOPLASM METASTASIS, 6274*
- SKIN NEOPLASMS
  - OCCUPATIONAL HAZARD, REVIEW, 6002
- SPERMATOZOA
  - CHROMOSOMES, 6185*
  - MUTAGENIC ACTIVITY, 6185*
- STOMACH NEOPLASMS
  - RISK BENEFIT STUDY, REVIEW, 6013
- TEMPERTURE SENSITIVE MUTANTS
  - ISOLATION AND CHARACTERIZATION, HAMSTER OVARY, 6249*
- THYROID NEOPLASMS
  - DIAGNOSIS AND PROGNOSIS, 6276*
- TISSUE CULTURE
  - HISTOLOGICAL STUDY, FIBROBLASTS, 6255*
  - TEMPERATURE, 6267*
- TRANSPLANTATION, HOMOLOGOUS
  - MAMMAE, 6257*
- URIDINE, 5-BROMO-2'-DEOXY-
  - TEMPERTURE SENSITIVE MUTANTS, 6249*
- VIRUS, HERPES
  - DNA REPAIR, REVIEW, 6020
- VIRUS, MOLONEY MURINE SARCOMA
  - T-LYMPHOCYTES, 6332*

RADIOISOTOPES
- KRYPTON
  - DOSE-RESPONSE STUDY, GUINEA PIG, RAT, HAMSTER, 6243*
- NEOPLASMS, RADIATION-INDUCED
  - RISK BENEFIT STUDY, REVIEW, 6013

RADIUM
- BONE NEOPLASMS
  - EPIDEMIOLOGY, 6245*
- NEOPLASMS
  - OCCUPATIONAL HAZARD, 6051*

RECEPTORS, HORMONE
- ESTRADIOL
  - MOUSE, NEWBORN, 6568
- THYROID NEOPLASMS
  - THYROTROPIN, 6565

RECTAL NEOPLASMS
- AGE FACTORS
  - EPIDEMIOLOGY, JAPAN, 6508

RESERPINE
- HYPERTENSION
  - PITUITARY HORMONES, 6229*
  - PROLACTIN, 6229*
  - STEROIDS, 6229*
- MENOPAUSE
  - PROLACTIN, 6229*
- PROLACTIN
  - SERUM LEVELS, 6229*

RESPIRATORY SYSTEM
- SMOKING
  - HYDROGEN-ION CONCENTRATION, 6175*

RESPIRATORY TRACT DISEASES
- EPIDEMIOLOGY
  - MASONS, 6515
- FIBERGLASS
  - EPIDEMIOLOGY, 6273*

RESPIRATORY TRACT NEOPLASMS
- ADENOCARCINOMA
  - EPIDEMIOLOGY, HAMSTER, 6432
- ARSENIC
  - DOSE-RESPONSE STUDY, 6048*
  - EPIDEMIOLOGY, 6048*
  - EPIDEMIOLOGY, REVIEW, 6006
  - OCCUPATIONAL HAZARD, 6048*
- BREAST NEOPLASMS
  - EPIDEMIOLOGY, CORRELATION STUDY, 6532*
- CHROMIC ACID, CALCIUM SALT, DIHYDRATE
  - EPIDEMIOLOGY, REVIEW, 6006
- CHROMIC ACID, LEAD(2+) SALT
  - EPIDEMIOLOGY, REVIEW, 6006
- CHROMIUM
  - EPIDEMIOLOGY, REVIEW, 6006
- DIPROPYLAMINE, N-NITROSO-
  - CARCINOGENIC METABOLITE, 6163
- EPIDEMIOLOGY
  - MASONS, 6515

  - FIBERGLASS
    - EPIDEMIOLOGY, 6273*
  - INCIDENCE RATES
    - EPIDEMIOLOGY, INDIA, 6511
  - NICKEL
    - EPIDEMIOLOGY, REVIEW, 6006
  - OCCUPATIONAL HAZARD
    - EPIDEMIOLOGY, REVIEW, 6003
    - MASONS, 6515
  - PRECANCEROUS CONDITIONS
    - ANIMAL MODEL, RAT, 6174*
  - SMOKING
    - ANIMAL MODEL, RAT, 6174*
    - COCARCINOGENIC ACTIVITY, REVIEW, 6003
    - PARTICLE DEPOSITION, RAT, 6174*
    - PRECANCEROUS CONDITIONS, 6174*

- RETICULOENDOTHELIOSIS
  - IGM
    - BONE MARROW CELLS, 6353
    - HAIRY CELLS, 6353
    - MACROPHAGES, 6353
  - IMMUNOGLOBULINS
    - BONE MARROW CELLS, 6353
    - HAIRY CELLS, 6353
    - MACROPHAGES, 6353
  - MACROPHAGES
    - HAIRY CELLS, 6353

- RETICULOSARCOMA
  - SEE SARCOMA, RETICULUM CELL

- RETINOBLASTOMA
  - GENETICS
    - PRECANCEROUS CONDITIONS, 6116*
  - NERVOUS SYSTEM NEOPLASMS
    - AUTOSOME ABNORMALITIES, REVIEW, 6117*

- RETINOL
  - BRONCHIAL NEOPLASMS
    - CARCINOMA, 6394
    - CARCINOMA, EPIDERMOID, 6394
    - CARCINOMA, OAT CELL, 6394
  - VIRUS, MURINE SARCOMA
    - CELL TRANSFORMATION, NEOPLASTIC, REVIEW, 6016

- RETRONECINE, 3,8-DIDEHYDRO-
  - NEOPLASMS, MUSCLE TISSUE
    - RHABDOMYOSARCOMA, 6213*

- REVERSE TRANSCRIPTASE
  - ONCOGENIC VIRUSES
    - SERUM, HUMAN, 6282
  - PROSTATIC NEOPLASMS
    - VIRUS, MURINE LEUKEMIA, 6318
  - VIRUS, AVIAN MYELOBLASTOSIS
    - POLYRIBONUCLEOTIDES, 6323*
  - VIRUS, MURINE LEUKEMIA
    - SERUM, HUMAN, 6282

- RHABDOMYOSARCOMA
  - EPIDEMIOLOGY
    - PARAGUAY, 6493
  - NEOPLASM TRANSPLANTATION
    - C-TYPE PARTICLES, 6302
  - NEOPLASMS, MUSCLE TISSUE
    - RETRONECINE, 3,8-DIDEHYDRO-, 6213*

- RIBONUCLEASE
  - BREAST NEOPLASMS
    - SERUM LEVELS, 6556
  - CARCINOMA, EHRLICH TUMOR
    - ISOLATION AND CHARACTERIZATION, REVIEW, 6133*
  - CELL TRANSFORMATION, NEOPLASTIC
    - ENZYMATIC ACTIVITY, REVIEW, 6133*
  - GASTROINTESTINAL NEOPLASMS
    - SERUM LEVELS, 6556
  - LUNG NEOPLASMS
    - SERUM LEVELS, 6556
  - PANCREATIC NEOPLASMS
    - SERUM LEVELS, 6556
  - PANCREATITIS
    - SERUM LEVELS, 6556
  - POLY A
    - HYDROLYSIS, 6555
    - RNA, MESSENGER, 6555
    - RNA, RIBOSOMAL, 6555
  - SARCOMA 37
    - ISOLATION AND CHARACTERIZATION, REVIEW, 6133*
  - SARCOMA 180, CROCKER
    - ISOLATION AND CHARACTERIZATION, REVIEW, 6133*

- RIFAMYCIN
  - LEUKEMIA, LYMPHOCYTIC
    - RNA POLYMERASE, 6557

- RNA
  - ANTIGENS, NEOPLASM
    - CYTOTOXICITY TESTS, IMMUNOLOGIC, 6343
    - IMMUNITY, CELLULAR, 6343
  - BREAST NEOPLASMS
    - CYTOTOXICITY TESTS, IMMUNOLOGIC, 6343
    - IMMUNE RESPONSE, HETEROLOGOUS LYMPHOCYTES, 6343
  - MELANOMA
    - CYTOTOXICITY TESTS, IMMUNOLOGIC, 6343
    - IMMUNE RESPONSE, HETEROLOGOUS LYMPHOCYTES, 6343
  - NEOPLASMS, EXPERIMENTAL
    - GUERIN TUMOR, 6553, 6554
    - LIVER, 6553, 6554
    - NUCLEOTIDES, 6553
    - OROTIC ACID, 6554
  - POLY A
    - HYDROLYSIS, 6555
  - STOMACH NEOPLASMS
    - CYTOTOXICITY TESTS, IMMUNOLOGIC, 6343
    - IMMUNE RESPONSE, HETEROLOGOUS LYMPHOCYTES, 6343

- RNA, MESSENGER
  - POLY A
    - RIBONUCLEASE, 6555
  - VIRUS, ADENO 2
    - DNA-RNA HYBRIDIZATION, 6308
    - ISOLATION AND CHARACTERIZATION, 6308
    - ULTRASTRUCTURAL STUDY, 6308

- VIRUS, FRIEND MURINE LEUKEMIA
  - HYBRID CELLS, 6576*
- VIRUS, RAUSCHER MURINE LEUKEMIA
  - CELL TRANSFORMATION, NEOPLASTIC, 6284
- VIRUS, ROUS SARCOMA
  - VIRUS, DNA TUMOR, 6298
- VIRUS, SV40
  - ANTIGENS, 6297

RNA POLYMERASE
- AFLATOXIN B1
  - BARBITURIC ACID, 5-ETHYL-5-PHENYL-, 6172*
- LEUKEMIA, LYMPHOCYTIC
  - ALPHA-AMANITINE, 6557
  - ISOLATION AND CHARACTERIZATION, 6557
  - RIFAMYCIN, 6557
- VIRUS, SV40
  - DNA, VIRAL, 6301
  - ISOLATION AND CHARACTERIZATION, 6301
  - NUCLEOPROTEINS, 6301

RNA REPLICATION
- AFLATOXIN B1
  - BARBITURIC ACID, 5-ETHYL-5-PHENYL-, 6172*
- PLASMINOGEN
  - CELL TRANSFORMATION, NEOPLASTIC, 6590*
- 1,3-PROPANEDIOL, 2-AMINO-2-(HYDROXYMETHYL)-
  - VIRUS, SV40, 6301
- TOLUENE, 2,4,6-TRINITRO-
  - VIRUS, SV40, 6301
- VIRUS, FRIEND MURINE LEUKEMIA
  - CELL CYCLE KINETICS, 6287
- VIRUS, ROUS SARCOMA
  - PLASMINOGEN, 6590*
- VIRUS, SV40
  - NUCLEOPROTEINS, 6301
  - THREITOL, 1,4-DITHIO-, 6301

RNA, RIBOSOMAL
- LEUKEMIA, LYMPHOCYTIC
  - CELL DIFFERENTIATION, 6596*
- POLY A
  - ESCHERICHIA COLI, 6555
  - RIBONUCLEASE, 6555
- VIRUS, RAUSCHER MURINE LEUKEMIA
  - CELL TRANSFORMATION, NEOPLASTIC, 6284

RNA, VIRAL
- VIRUS, HERPES SIMPLEX 1
  - DNA-RNA HYBRIDIZATION, REVIEW, 6083*
- VIRUS, MOLONEY MURINE SARCOMA-LEUKEMIA
  - ISOLATION AND CHARACTERIZATION, 6289
  - POLY A, 6289
- VIRUS, RAUSCHER MURINE LEUKEMIA
  - CELL TRANSFORMATION, NEOPLASTIC, 6284
- VIRUS, ROUS SARCOMA
  - DNA-RNA HYBRIDIZATION, 6298
  - VIRUS, DNA TUMOR, 6298

RORSCHACH TEST
- LUNG NEOPLASMS
  - DIAGNOSTIC VALUE, 6531*

SACCHAROMYCES CEREVISIAE
- CARCINOGEN, CHEMICAL
  - SCREENING METHOD, 6187*

SALICYLIC ACID, 4-AMINO-
- AFLATOXIN B1
  - ACETATE INCORPORATION, 6168*

SALIVARY GLAND NEOPLASMS
- CARCINOMA
  - RADIATION, IONIZING, 6274*
- RADIATION, IONIZING
  - CASE REPORT, 6274*
  - NEOPLASM METASTASIS, 6274*

SALMONELLA TYPHIMURIUM
- BENZ(A)ANTHRACENE
  - CARCINOGENIC METABOLITE, 6197*
  - MICROSOMES, LIVER, 6197*
  - MUTAGENIC ACTIVITY, 6204*
- BENZ(A)ANTHRACENE, 7,12-DIMETHYL-
  - CARCINOGENIC METABOLITE, 6197*
  - MICROSOMES, LIVER, 6197*
- BENZ(A)ANTHRACENE, 3,4-DIOL
  - MUTAGENIC ACTIVITY, 6204*
- BENZ(A)ANTHRACENE, 8,9-DIOL
  - MUTAGENIC ACTIVITY, 6204*
- BENZO(A)PYRENE
  - CARCINOGENIC METABOLITE, 6197*
  - MICROSOMES, LIVER, 6197*
- CARCINOGEN, CHEMICAL
  - SCREENING METHOD, 6187*
- DIETHYLAMINE, N-NITROSO-
  - MUTAGENIC ACTIVITY, 6138
- DIMETHYLAMINE, N-NITROSO-
  - MUTAGENIC ACTIVITY, 6138
- ETHYLENE, CHLORO-
  - MUTAGENIC ACTIVITY, 6138
- MORPHOLINE, N-NITROSO-
  - MUTAGENIC ACTIVITY, 6138
- NITROSAMINES
  - MUTAGENIC ACTIVITY, 6138
- TRIAZENE, 3,3-DIMETHYL-1-M-CARBOXYPHENYL-
  - MUTAGENIC ACTIVITY, 6171*
- TRIAZENE, 3,3-DIMETHYL-1-O-CARBOXYPHENYL-
  - MUTAGENIC ACTIVITY, 6171*
- TRIAZENE, 3,3-DIMETHYL-1-O-NITROPHENYL-
  - MUTAGENIC ACTIVITY, 6171*
- TRIAZENE, 3,3-DIMETHYL-1-P-ACETAMINOPHENYL-
  - MUTAGENIC ACTIVITY, 6171*
- TRIAZENE, 3,3-DIMETHYL-1-P-BROMOPHENYL-
  - MUTAGENIC ACTIVITY, 6171*
- TRIAZENE, 3,3-DIMETHYL-1-P-CARBOXYPHENYL-
  - MUTAGENIC ACTIVITY, 6171*
- TRIAZENE, 3,3-DIMETHYL-1-P-CHLOROPHENYL-
  - MUTAGENIC ACTIVITY, 6171*
- TRIAZENE, 3,3-DIMETHYL-1-P-METHOXYPHENYL-

    - MUTAGENIC ACTIVITY, 6171*
  - TRIAZENE, 3,3-DIMETHYL-1-P-METHYLPHENYL-
    - MUTAGENIC ACTIVITY, 6171*
  - TRIAZENE, 3,3-DIMETHYL-1-PHENYL-
    - MUTAGENIC ACTIVITY, 6171*
  - TRIAZENE, 3,3-DIMETHYL-1-(2,4,6-TRIBROMOPHENYL)-
    - MUTAGENIC ACTIVITY, 6171*
  - TRIAZENE, 3,3-DIMETHYL-1-(2,4,6-TRICHLOROPHENYL)-
    - MUTAGENIC ACTIVITY, 6171*

SARCOIDOSIS
  - ANGIOTENSINASE
    - ENZYMATIC ACTIVITY, LYMPH NODES, 6417
  - GRANULOMA
    - ENZYMATIC ACTIVITY, LYMPH NODES, 6417

SARCOMA
  - ANTIGENS, NEOPLASM
    - TRANSPLANTATION IMMUNOLOGY, 6373
  - BENZ(A)ANTHRACENE, 7,12-DIMETHYL-
    - ANGIOSARCOMA, 6060*
  - BENZ(E)ACEPHENANTHRYLENE
    - ANGIOSARCOMA, 6060*
  - BENZO(A)PYRENE
    - ANGIOSARCOMA, 6060*
  - CELL MEMBRANE
    - FORSSMAN ANTIGEN, 6570
    - GANGLIOSIDES, 6570
    - TRANSFERASES, 6570
  - CHOLANTHRENE, 3-METHYL-
    - TRANSPLANTATION IMMUNOLOGY, 6373
  - EPIDEMIOLOGY
    - PARAGUAY, 6493
  - FOREIGN BODIES
    - HISTOLOGICAL STUDY, REVIEW, 6014
    - PRECANCEROUS CONDITIONS, REVIEW, 6014
  - IRON
    - CASE REPORT, 6164
  - LUNG NEOPLASMS
    - NEOPLASM METASTASIS, 6436*
  - MELANOMA
    - NEOPLASMS, MULTIPLE PRIMARY, 6406
  - NEOPLASM TRANSPLANTATION
    - C-TYPE PARTICLES, 6302
  - NEOPLASMS, CONNECTIVE TISSUE
    - IRON, 6164
    - NEUROFIBROMATOSIS, 6441*
  - NOSE NEOPLASMS
    - ANIMALS, DOMESTIC, 6433
  - PLANT AGGLUTININS
    - BINDING, 6570
  - TOXINS
    - BINDING, 6570
  - TRANSPLANTATION, HOMOLOGOUS
    - NEOPLASM METASTASIS, 6436*
  - VIRUS, ROUS SARCOMA
    - IMMUNITY, CELLULAR, 6278

SARCOMA 37
  - RIBONUCLEASE
    - ISOLATION AND CHARACTERIZATION, REVIEW, 6133*

SARCOMA 180, CROCKER
  - RIBONUCLEASE
    - ISOLATION AND CHARACTERIZATION, REVIEW, 6133*

SARCOMA, OSTEOGENIC
  - ANEMIA, APLASTIC
    - GENETICS, 6420
  - BONE NEOPLASMS
    - BIOCHEMICAL STUDY, REVIEW, 6103*
    - IMMUNITY, CELLULAR, 6367
  - NEOPLASM METASTASIS
    - DOG, REVIEW, 6104*
    - NEOPLASM TRANSPLANTATION, 6104*
  - PARATHYROID HORMONE
    - ADENOSINE CYCLIC 3',5' MONOPHOSPHATE, 6567
  - PHOSPHATE
    - ADENOSINE CYCLIC 3',5' MONOPHOSPHATE, 6567
    - PARATHYROID HORMONE, 6567
  - TRANSPLANTATION, HETEROLOGOUS
    - VIRUS-LIKE PARTICLES, 6327*
  - VIRUS-LIKE PARTICLES
    - TUBULORETICULAR STRUCTURES, 6327*

SARCOMA, RETICULUM CELL
  - BRAIN NEOPLASMS
    - VIRUS, PAPOVA, 6337*
  - INTESTINAL NEOPLASMS
    - EPIDEMIOLOGY, IRAN, 6533*
  - NEOPLASMS, MULTIPLE PRIMARY
    - GENETICS, 6418
    - PREDNISONE, 6395
    - PURINE, 6-((1-METHYL-4-NITROIMIDAZOL-5-YL)THIO)-, 6395

SEBACEOUS CYST
  - SKIN NEOPLASMS
    - HISTOLOGICAL STUDY, 6402

SEBACEOUS GLAND NEOPLASMS
  - ADENOMA
    - ULTRASTRUCTURAL STUDY, 6299
    - VIRUS-LIKE PARTICLES, 6299

SEBORRHEA
  - GLUCOSEPHOSPHATE DEHYDROGENASE
    - ENZYMATIC ACTIVITY, 6599*
  - ISOMERASES
    - ENZYMATIC ACTIVITY, 6599*
  - PHOSPHOGLUCONATE DEHYDROGENASE
    - ENZYMATIC ACTIVITY, 6599*
  - TRANSFERASES
    - ENZYMATIC ACTIVITY, 6599*

SEMINOMA
  - SEE DISGERMINOMA

SERTOLI CELL TUMOR
  - TESTICULAR NEOPLASMS
    - 17-KETOSTEROIDS, REVIEW, 6111*

SILICA
  - PROMETHIUM
    - LUNG CLEARANCE, MOUSE, 6232

SILYMARIN
  - ACETAMIDE, THIO-

    - PHOSPHOLIPIDS, 6183*

IN NEOPLASMS
- AMYLASE
    - CASE REPORT, 6462*
- ARSENIC
    - EPIDEMIOLOGY, REVIEW, 6006
- BENZO(A)PYRENE
    - OCCUPATIONAL HAZARD, REVIEW, 6004
- CARCINOGEN, CHEMICAL
    - OCCUPATIONAL HAZARD, REVIEW, 6002
- CARCINOGEN, ENVIRONMENTAL
    - FISHES, REVIEW, 6065*
- CARCINOMA
    - NICOTINE, 6176*
    - ULTRAVIOLET RAYS, 6266*
- CARCINOMA, EPIDERMOID
    - HISTOLOGICAL STUDY, 6402
- CELL CYCLE KINETICS
    - REVIEW, 6029
- COAL TAR
    - OCCUPATIONAL HAZARD, REVIEW, 6004
- ETHANOL, 2,2',2''-NITRILOTRIS-
    - CARCINOGENIC POTENTIAL, RAT, 6155
- FISHES
    - INCIDENCE RATES, CALIFORNIA, 6524*
- HEMANGIOPERICYTOMA
    - INFANT, 6464*
- MELANOMA
    - EPIDEMIOLOGY, 6474*
- 1,2-OXATHIOLANE, 2,2-DIOXIDE
    - CARCINOGENIC POTENTIAL, MOUSE, 6223*
- PAPILLOMA
    - NICOTINE, 6176*
- PETROLEUM
    - OCCUPATIONAL HAZARD, REVIEW, 6004
- RADIATION, IONIZING
    - OCCUPATIONAL HAZARD, REVIEW, 6002
- SCALP
    - DIAGNOSIS AND CLASSIFICATION, 6402
    - HISTOLOGICAL STUDY, 6402
- SEBACEOUS CYST
    - HISTOLOGICAL STUDY, 6402
- STOMACH NEOPLASMS
    - IGM, 6354
- TISSUE CULTURE
    - REVIEW, 6029
- TOBACCO
    - SMOKE CONDENSATE, 6176*
- TURNER'S SYNDROME
    - CASE REPORT, 6442*
- ULTRAVIOLET RAYS
    - ANTILYMPHOCYTE SERUM, 6264*
    - ERYTHEMIA, 6266*
    - OCCUPATIONAL HAZARD, REVIEW, 6002
    - PRECANCEROUS CONDITIONS, 6266*
    - PURINE-6-THIOL, 6264*
    - TANNING, 6266*
- VIRUS, HERPES
    - CARCINOGENIC POTENTIAL, REVIEW, 6019
- VIRUS, HERPES SIMPLEX
    - ISOLATION AND CHARACTERIZATION, REVIEW, 6019
- VIRUS, PAPILLOMA
    - ISOLATION AND CHARACTERIZATION, REVIEW, 6019
- VIRUS, VARICELLA-ZOSTER
    - ISOLATION AND CHARACTERIZATION, REVIEW, 6019
- WOUNDS AND INJURIES
    - OCCUPATIONAL HAZARD, REVIEW, 6002

SMOKING
- ASBESTOS
    - CO-CARCINOGENIC ACTIVITY, REVIEW, 6514
- BENZO(A)PYRENE
    - METABOLSIM, 6196*
- BLADDER NEOPLASMS
    - COCARCINOGENIC ACTIVITY, REVIEW, 6003
- CARCINOEMBRYONIC ANTIGEN
    - SERUM LEVELS, 6520
- CONCANAVALIN A
    - MACROPHAGES, 6173*
- COUMARIN, 7-ETHOXY-
    - METABOLSIM, 6196*
- DIETHYLAMINE, N-NITROSO-
    - COCARCINOGENIC EFFECT, 6179*
- ESOPHAGEAL NEOPLASMS
    - EPIDEMIOLOGY, BLACKS, 6504
- GLUTARALDEHYDE
    - MACROPHAGES, 6173*
- HYDROGEN-ION CONCENTRATION
    - BUFFERING CAPACITY, 6175*
    - CARCINOGENIC POTENTIAL, 6175*
    - RESPIRATORY SYSTEM, 6175*
- LARYNGEAL NEOPLASMS
    - DIETHYLAMINE, N-NITROSO-, 6179*
- LIVER NEOPLASMS
    - DIETHYLAMINE, N-NITROSO-, 6179*
- MACROPHAGES
    - AGGLUTINATION, 6173*
    - PULMONARY ALVEOLI, 6173*
- MANNOSE
    - MACROPHAGES, 6173*
- NEOPLASMS
    - REVIEW, 6037*
- RESPIRATORY TRACT NEOPLASMS
    - ANIMAL MODEL, RAT, 6174*
    - COCARCINOGENIC ACTIVITY, REVIEW, 6003
    - PARTICLE DEPOSITION, RAT, 6174*
    - PRECANCEROUS CONDITIONS, 6174*

SODIUM FLUORIDE
- AFLATOXIN B1
    - ACETATE INCORPORATION, 6168*

SOMATOTROPIN
- PITUITARY NEOPLASMS
    - METABOLISM, REVIEW, 6101*

SPERMATOZOA
- ANTINEOPLASTIC AGENTS
    - CHROMOSOMES, 6185*
    - MUTAGENIC ACTIVITY, 6185*
- ANTIVIRAL AGENTS
    - MUTAGENIC ACTIVITY, 6221*
- RADIATION, IONIZING
    - CHROMOSOMES, 6185*
    - MUTAGENIC ACTIVITY, 6185*
- UREA, N-METHYL-N-(4-PHENYLTHIAZOLYL)-
    - MUTAGENIC ACTIVITY, 6221*

SPHINGOMYELINS

- LEUKEMIA, LYMPHOCYTIC
  - LEUKOCYTES, 6569

SPLENECTOMY
- HODGKIN'S DISEASE
  - DIAGNOSIS AND TREATMENT, 6467*

STEROIDS
- CORTICOTROPIN
  - ADRENAL CORTEX HORMONES, 6566
- HYPERTENSION
  - RESERPINE, 6229*
- OVARIAN NEOPLASMS
  - EPIDEMIOLOGY, REVIEW, 6112*
- PLASMINOGEN
  - LUNG, EMBRYO, 6590*
- TESTICULAR NEOPLASMS
  - BIOCHEMICAL STUDY, REVIEW, 6111*

STEROLS
- COLONIC NEOPLASMS
  - EPIDEMIOLOGY, REVIEW, 6105*

STOMACH NEOPLASMS
- ADENOCARCINOMA
  - GUANIDINE, 1-METHYL-3-NITRO-1-NITROSO-, 6156
  - LACTATE DEHYDROGENASE ISOENZYMES, 6560
  - PROTEINS, 6549
  - TETRACYCLINE, 7-CHLORO-6-DEMETHYL-, 6549
- BACTERIA
  - NITROSAMINE PRODUCTION, 6106*
- BLOOD GROUPS
  - EPIDEMIOLOGY, 6510
- CARBAMIC ACID, ETHYLNITROSO-, ETHYL ESTER
  - DOSE-RESPONSE STUDY, 6218*
- CARBAMIC ACID, METHYL-, 1-NAPHTHYL ESTER
  - N-NITROSO DERIVATIVE, 6218*, 6220*
- CARBAMIC ACID, N-METHYL-N-NITROSO-, ETHYL ESTER
  - DOSE-RESPONSE STUDY, 6218*
- CARCINOMA, EPIDERMOID
  - CARBAMIC ACID, METHYL-, 1-NAPHTHYL ESTER, 6220*
- CARCINOMA, MUCINOUS
  - GUANIDINE, 1-METHYL-3-NITRO-1-NITROSO-, 6156
- DIAGNOSIS AND PROGNOSIS
  - EPIDEMIOLOGY, JAPAN, 6506
- EPIDEMIOLOGY
  - AUSTRIA, 6529*
- GUANIDINE, 1-METHYL-3-NITRO-1-NITROSO-
  - CARCINOGENICITY, RAT, HAMSTER, DOG, 6156
- LACTATE DEHYDROGENASE ISOENZYMES
  - TISSUE LEVELS, 6560
- MENINGES
  - NEOPLASM METASTASIS, 6460*
- METAPLASIA
  - LACTATE DEHYDROGENASE ISOENZYMES, 6560
- NEOPLASM METASTASIS
  - IGM, 6354
- PEPTIC ULCER
  - EPIDEMIOLOGY, 6534*
- POPULATION SCREENING
  - EPIDEMIOLOGY, JAPAN, 6506
- PRECANCEROUS CONDITIONS
  - CYTODIAGNOSIS, 6447*
  - EPIDEMIOLOGY, 6529*
- RADIATION, IONIZING
  - RISK BENEFIT STUDY, REVIEW, 6013
- RNA
  - CYTOTOXICITY TESTS, IMMUNOLOGIC, 6343
  - IMMUNE RESPONSE, HETEROLOGOUS LYMPHOCYTES, 6343
- SKIN NEOPLASMS
  - IGM, 6354
- TRANSPLANTATION, HETEROLOGOUS
  - MUCIN, 6375
  - ULTRASTRUCTURAL STUDY, 6375

STREPTOVARICINS
- VIRUS, MOLONEY MURINE LEUKEMIA
  - VIRUS REPLICATION, REVIEW, 6079*

STRESS
- VIRUS, MURINE SARCOMA
  - CELL TRANSFORMATION, NEOPLASTIC, REVIEW, 6016

STRONTIUM RADIOISOTOPES
- VIRUS, FRIEND MURINE LEUKEMIA
  - BONE MARROW CELLS, 6328*
  - IMMUNE RESPONSE, 6328*
  - LYMPHOCYTE TRANSFORMATION, 6328*

STYRENE
- WATER POLLUTANTS
  - DISTRIBUTION, REVIEW, 6064*

SULFANILIC ACID
- FIBROSARCOMA
  - IMMUNITY, CELLULAR, 6393*

SURGERY, OPERATIVE
- INTESTINAL NEOPLASMS
  - POLYPS, 6468*

TERATOGENS
- FETAL DISEASES
  - ANIMAL MODEL, REVIEW, 6115*
  - CLASSIFICATION, REVIEW, 6115*
- TRANSPLACENTAL CARCINOGENESIS
  - ANIMAL MODEL, REVIEW, 6115*

TERATOID TUMOR
- ANTIGENS, NEOPLASM
  - CELL DIFFERENTIATION, REVIEW, 6129*
- BLASTOCYST
  - CELL DIFFERENTIATION, 6490*
- CELL DIFFERENTIATION
  - HISTOLOGICAL STUDY, 6489*
  - RAT, 6130*
  - TRANSPLANTATION, 6130*
  - ULTRASTRUCTURAL STUDY, 6485*
  - VIRUS REPLICATION, 6488*
- CELLS, CULTURED
  - CELL DIFFERENTIATION, REVIEW, 6129*
- CLONE CELLS
  - CELL DIFFERENTIATION, 6485*

- EMBRYO
  - CELL DIFFERENTIATION, 6487*, 6490*
- ENZYMATIC ACTIVITY
  - CELL DIFFERENTIATION, REVIEW, 6129*
- FIBRINOLYSIS
  - CELL DIFFERENTIATION, REVIEW, 6129*
- KIDNEY
  - CELL DIFFERENTIATION, 6487*
- MOSAICISM
  - CELL DIFFERENTIATION, 6490*
- NEOPLASM TRANSPLANTATION
  - CELL DIFFERENTIATION, 6489*
  - CELL DIFFERENTIATION, REVIEW, 6129*
  - GRAFT REJECTION, 6490*
- OVARIAN NEOPLASMS
  - NEOPLASM TRANSPLANTATION, 6489*
  - NEUROFIBROMATOSIS, 6441*
- PLOIDY
  - CELL DIFFERENTIATION, 6487*
- TESTICULAR NEOPLASMS
  - CASE REPORT, 6495
  - CELL DIFFERENTIATION, 6487*
  - EPIDEMIOLOGY, 6495
  - NEOPLASM TRANSPLANTATION, 6489*
- VIRUS, MENGO
  - VIRUS, SV40, 6488*
- VIRUS, POLYOMA
  - VIRUS REPLICATION, 6488*
- VIRUS, SV40
  - VIRUS REPLICATION, 6488*

TESTICULAR NEOPLASMS
- ANDROGENS
  - BIOCHEMICAL STUDY, REVIEW, 6111*
- CHORIOCARCINOMA
  - EPIDEMIOLOGY, 6495
- CRYPTORCHISM
  - EPIDEMIOLOGY, 6528*
- DISGERMINOMA
  - CRYPTORCHISM, 6528*
  - EPIDEMIOLOGY, 6495
  - 17-KETOSTEROIDS, REVIEW, 6111*
- GENETICS
  - EPIDEMIOLOGY, REVIEW, 6113*
- GONADOTROPINS
  - BIOCHEMICAL STUDY, REVIEW, 6111*
- GRANULOSA CELL TUMOR
  - 17-KETOSTEROIDS, REVIEW, 6111*
- HERNIA
  - EPIDEMIOLOGY, 6528*
- HORMONES
  - NEOPLASMS, EXPERIMENTAL, REVIEW, 6047*
- LEYDIG CELL TUMOR
  - 17-KETOSTEROIDS, REVIEW, 6111*
- POLYCYCLIC HYDROCARBONS
  - OCCUPATIONAL HAZARD, REVIEW, 6004
- SERTOLI CELL TUMOR
  - 17-KETOSTEROIDS, REVIEW, 6111*
- STEROIDS
  - BIOCHEMICAL STUDY, REVIEW, 6111*
- TERATOID TUMOR
  - CASE REPORT, 6495
  - CELL DIFFERENTIATION, 6487*
  - EPIDEMIOLOGY, 6495
  - NEOPLASM TRANSPLANTATION, 6489*

TETRACYCLINE, 7-CHLORO-6-DEMETHYL-
- STOMACH NEOPLASMS
  - ADENOCARCINOMA, 6549

TETRAHYMENA PYRIFORMIS
- AFLATOXIN B1
  - PHOTOTOXIC EFFECTS, 6147
- BENZO(A)PYRENE
  - PHOTOTOXIC EFFECTS, 6147
- DIBENZ(A,H)ANTHRACENE
  - PHOTOTOXIC EFFECTS, 6147
- FLUORANTHENE
  - PHOTOTOXIC EFFECTS, 6147

THECA CELL TUMOR
- OVARIAN NEOPLASMS
  - EPIDEMIOLOGY, REVIEW, 6112*

THORACIC NEOPLASMS
- GANGLIONEUROMA
  - NEUROFIBROMATOSIS, 6441*
- NEUROFIBROMATOSIS
  - EPIDEMIOLOGY, 6441*

THREITOL, 1,4-DITHIO-
- DNA, MITOCHONDRIAL
  - DNA REPLICATION, 6551
- VIRUS, SV40
  - NUCLEOPROTEINS, 6305
  - RNA REPLICATION, 6301

THROMBIN
- CELL MEMBRANE
  - PROTEINS, 6592*
- FIBROBLASTS
  - PROTEINS, 6592*

THYMIDINE
- CARCINOGEN, CHEMICAL
  - SCREENING METHOD, 6187*

THYMIDINE KINASE
- HEPATOMA
  - ZINC, 6577*
- VIRUS, HERPES SIMPLEX
  - VIRUS REPLICATION, REVIEW, 6079*
- VIRUS, HERPES SIMPLEX 1
  - CELLS, CULTURED, 6317
- VIRUS, HERPES SIMPLEX 2
  - CELLS, CULTURED, 6317

THYMINE
- ULTRAVIOLET RAYS
  - DNA, PHOTOCHEMICAL REACTIONS, REVIEW, 6077*

THYMOMA
- VIRUS, GROSS MURINE LEUKEMIA
  - TISSUE DISTRIBUTION, 6285

THYMUS GLAND
- VIRUS, RAUSCHER MURINE LEUKEMIA
  - CELL DIFFERENTIATION, 6288

THYMUS NEOPLASMS
- HYPERPLASIA
  - REVIEW, CHILD, 6030
- IMMUNOLOGIC DEFICIENCY SYNDROMES
  - REVIEW, CHILD, 6030

  - LYMPHOCYTES
    - CELL DIFFERENTIATION, 6030

- THYROID NEOPLASMS
  - ADENOCARCINOMA
    - EPIDEMIOLOGY, POLAND, 6502
    - NEOPLASM METASTASIS, 6473*
  - ADENOMA
    - THYROTROPIN, 6565
  - CALCITONIN
    - RADIOIMMUNOASSAY, 6538
  - CARCINOMA
    - CALCITONIN, 6538
    - CASE REPORT, CHILD, 6439*
  - CARCINOMA, PAPILLARY
    - EPIDEMIOLOGY, POLAND, 6502
    - THYROTROPIN, 6565
  - ETHYL ALCOHOL
    - EPIDEMIOLOGY, MORMONS, 6503
  - GOITER
    - EPIDEMIOLOGY, POLAND, 6502
  - HORMONES
    - NEOPLASMS, EXPERIMENTAL, REVIEW, 6047*
  - NEOPLASM METASTASIS
    - CASE REPORT, 6473*
  - NEOPLASTIC ENDOCRINE-LIKE SYNDROMES
    - CASE REPORT, CHILD, 6439*
  - RADIATION, IONIZING
    - DIAGNOSIS AND PROGNOSIS, 6276*
  - RECEPTORS, HORMONE
    - THYROTROPIN, 6565
  - THYROIDECTOMY
    - EPIDEMIOLOGY, 6501

- THYROIDECTOMY
  - THYROID NEOPLASMS
    - EPIDEMIOLOGY, 6501

- THYROTROPIN
  - THYROID NEOPLASMS
    - ADENOMA, 6565
    - CARCINOMA, PAPILLARY, 6565
    - RECEPTORS, HORMONE, 6565

- TISSUE CULTURE
  - CORTICOTROPIN
    - ADRENAL CORTEX HORMONES, 6566
  - EPITHELIAL CELLS
    - REVIEW, 6029
  - RADIATION, IONIZING
    - HISTOLOGICAL STUDY, FIBROBLASTS, 6255*
    - TEMPERATURE, 6267*
  - SKIN NEOPLASMS
    - REVIEW, 6029

- TISSUE EXTRACTS
  - COLONIC NEOPLASMS
    - DNA REPLICATION, 6384*
    - LYMPHOCYTE TRANSFORMATION, 6384*

- TOBACCO
  - SKIN NEOPLASMS
    - SMOKE CONDENSATE, 6176*

- P-TOLUAMIDE, N-ISOPROPYL-ALPHA-(2-METHYLHYDRAZINO)-
  - ARTHRITIS, RHEUMATOID
    - CARCINOGENIC POTENTIAL, 6167
  - CHROMOSOME ABERRATIONS
    - ARTHRITIS, 6166

- TOLUENE-2,4-DIAMINE
  - CARCINOGENIC METABOLITE
    - ISOLATION AND IDENTIFICATION, RABBIT, RAT, GUINEA PIG, 6150
  - LUNG NEOPLASMS
    - CARCINOGENIC ACTIVITY, REVIEW, 6055*

- TOLUENE, 2,4,6-TRINITRO-
  - VIRUS, SV40
    - RNA REPLICATION, 6301

- M-TOLUIDINE, N,N-DIMETHYL-4-(PHENYLAZO)-
  - HEPATOMA
    - CELL LINE, 6144
    - KARYOTYPING, 6144
    - ULTRASTRUCTURAL STUDY, 6144

- TONGUE NEOPLASMS
  - CARCINOMA
    - CASE REPORT, 6461*
    - ULTRASTRUCTURAL STUDY, 6461*
  - NEOPLASM METASTASIS
    - CASE REPORT, 6461*

- TONSIL
  - VIRUS, EPSTEIN-BARR
    - LEUKOCYTES, 6314

- TOXINS
  - SARCOMA
    - BINDING, 6570

- TRACE ELEMENTS
  - WATER POLLUTION
    - CARCINOGENIC POTENTIAL, FISH, 6524*

- TRANSFERASES
  - BENZO(A)PYRENE
    - LIVER, 6199*
    - LYMPHOCYTES, 6199*
  - CARCINOMA, BASAL CELL
    - ENZYMATIC ACTIVITY, 6599*
  - CARCINOMA, EPIDERMOID
    - ENZYMATIC ACTIVITY, 6599*
  - GUANIDINE, 1-METHYL-3-NITRO-1-NITROSO-
    - CELL TRANSFORMATION, NEOPLASTIC, 6338*
    - CELLS, CULTURED, 6338*
  - HEPATOMA
    - ENZYMATIC ACTIVITY, 6562
  - KERATOACANTHOMA
    - ENZYMATIC ACTIVITY, 6599*
  - OUABAIN
    - CELL TRANSFORMATION, NEOPLASTIC, 6338*
    - CELLS, CULTURED, 6338*
  - SARCOMA
    - CELL MEMBRANE, 6570
  - SEBORRHEA
    - ENZYMATIC ACTIVITY, 6599*

- TRANSPLANTATION
  - CELL DIFFERENTIATION

- TERATOID TUMOR, 6130*

TRANSPLANTATION ANTIGENS
- SEE HISTOCOMPATIBILITY ANTIGENS

TRANSPLANTATION, HETEROLOGOUS
- BREAST NEOPLASMS
  - ULTRASTRUCTURAL STUDY, 6375
- CARCINOMA, EPIDERMOID
  - MOUSE, NUDE, 6376
- CARCINOMA, SCIRRHOUS
  - CELL DIFFERENTIATION, 6375
- GASTROINTESTINAL NEOPLASMS
  - ADENOCARCINOMA, 6376
  - MOUSE, NUDE, 6376
- HELA CELLS
  - BLASTOCYST, 6539
  - ULTRASTRUCTURAL STUDY, 6539
- HEPATOMA
  - FETAL GLOBULINS, 6375
  - ULTRASTRUCTURAL STUDY, 6375
- LEUKEMIA
  - MOUSE, NUDE, 6376
- LUNG NEOPLASMS
  - CORTICOTROPIN, 6375
  - ULTRASTRUCTURAL STUDY, 6375
- MELANOMA
  - MELANIN, 6375
  - MOUSE, NUDE, 6376
- NEOPLASMS
  - DRUG THERAPY, 6376
- SARCOMA, OSTEOGENIC
  - VIRUS-LIKE PARTICLES, 6327*
- STOMACH NEOPLASMS
  - MUCIN, 6375
  - ULTRASTRUCTURAL STUDY, 6375

TRANSPLANTATION, HOMOLOGOUS
- CELL TRANSFORMATION, NEOPLASTIC
  - IMMUNOSUPPRESSION, REVIEW, 6091*
- GRAFT VS HOST REACTION
  - RADIATION EFFECTS, MAMMAE, RAT, 6257*
- IMMUNOSUPPRESSIVE AGENTS
  - IMMUNE RESPONSE, REVIEW, 6090*
- LEUKEMIA, MYELOCYTIC
  - DNA, NEOPLASM, 6299
- MOUTH NEOPLASMS
  - CARCINOMA, BASAL CELL, 6463*
- RADIATION, IONIZING
  - MAMMAE, 6257*
- SARCOMA
  - NEOPLASM METASTASIS, 6436*

TRANSPLANTATION IMMUNOLOGY
- BLADDER NEOPLASMS
  - NEOPLASM TRANSPLANTATION, 6377
- BONE NEOPLASMS
  - CHOLANTHRENE, 3-METHYL-, 6373
- GASTROINTESTINAL NEOPLASMS
  - NEOPLASM TRANSPLANTATION, 6377
- HEPATOMA
  - NEOPLASM TRANSPLANTATION, 6377
- MAMMARY NEOPLASMS, EXPERIMENTAL
  - NEOPLASM TRANSPLANTATION, 6377
- NEOPLASMS, EXPERIMENTAL
  - BCG VACCINATION, 6378
  - VIRUS, SV40, 6378
- OVARIAN NEOPLASMS
  - NEOPLASM TRANSPLANTATION, 6377
- SARCOMA
  - ANTIGENS, NEOPLASM, 6373
  - CHOLANTHRENE, 3-METHYL-, 6373

TRIAZENE, 3,3-DIMETHYL-1-M-CARBOXYPHENYL-
- SALMONELLA TYPHIMURIUM
  - MUTAGENIC ACTIVITY, 6171*

TRIAZENE, 3,3-DIMETHYL-1-O-CARBOXYPHENYL-
- SALMONELLA TYPHIMURIUM
  - MUTAGENIC ACTIVITY, 6171*

TRIAZENE, 3,3-DIMETHYL-1-O-NITROPHENYL-
- SALMONELLA TYPHIMURIUM
  - MUTAGENIC ACTIVITY, 6171*

TRIAZENE, 3,3-DIMETHYL-1-P-ACETAMINOPHENYL-
- SALMONELLA TYPHIMURIUM
  - MUTAGENIC ACTIVITY, 6171*

TRIAZENE, 3,3-DIMETHYL-1-P-BROMOPHENYL-
- SALMONELLA TYPHIMURIUM
  - MUTAGENIC ACTIVITY, 6171*

TRIAZENE, 3,3-DIMETHYL-1-P-CARBOXYPHENYL-
- SALMONELLA TYPHIMURIUM
  - MUTAGENIC ACTIVITY, 6171*

TRIAZENE, 3,3-DIMETHYL-1-P-CHLOROPHENYL-
- SALMONELLA TYPHIMURIUM
  - MUTAGENIC ACTIVITY, 6171*

TRIAZENE, 3,3-DIMETHYL-1-P-METHOXYPHENYL-
- SALMONELLA TYPHIMURIUM
  - MUTAGENIC ACTIVITY, 6171*

TRIAZENE, 3,3-DIMETHYL-1-P-METHYLPHENYL-
- SALMONELLA TYPHIMURIUM
  - MUTAGENIC ACTIVITY, 6171*

TRIAZENE, 3,3-DIMETHYL-1-PHENYL-
- MICROSOMES, LIVER
  - MUTAGENIC METABOLITE, 6171*
- MUTAGENIC METABOLITE
  - MICROSOMES, LIVER, 6171*
- SALMONELLA TYPHIMURIUM
  - MUTAGENIC ACTIVITY, 6171*

TRIAZENE, 3,3-DIMETHYL-1-(2,4,6-TRIBROMOPHENYL)-
- SALMONELLA TYPHIMURIUM
  - MUTAGENIC ACTIVITY, 6171*

TRIAZENE, 3,3-DIMETHYL-1-(2,4,6-TRICHLOROPHENYL)-
- SALMONELLA TYPHIMURIUM
  - MUTAGENIC ACTIVITY, 6171*

TRICHOMONAS VAGINALIS
- CERVIX NEOPLASMS
  - EPIDEMIOLOGY, REVIEW, 6085*

TRIGLYCERIDES
- LEUKEMIA, LYMPHOCYTIC
  - LEUKOCYTES, 6569

TRIPHOSPHATES

- ARSENIC ACID, DISODIUM SALT
    - LYMPHOCYTES, 6547

- TRYPSIN
    - CELL MEMBRANE
        - PROTEINS, 6592*
    - FIBROBLASTS
        - CELL ADHESION, 6592*
        - CELL DIVISION, 6593*
        - CONCANAVALIN A, 6593*
        - , 6592*
        - PROTEINS, 6592*

- TRYPTOPHAN
    - CARCINOEMBRYONIC ANTIGEN
        - CHEMICAL MODIFICATION, 6348

- TUBERCULIN
    - B-LYMPHOCYTES
        - CELL DIFFERENTIATION, 6368
        - DNA REPLICATION, 6368
    - MELANOMA
        - LYMPHOKINES, 6370

- TUBERCUS SCLEROSIS
    - NERVOUS SYSTEM NEOPLASMS
        - AUTOSOME ABNORMALITIES, REVIEW, 6117*

- TURNER'S SYNDROME
    - INTESTINAL NEOPLASMS
        - CASE REPORT, 6442*
    - PULMONARY VALVE STENOSIS
        - CASE REPORT, 6442*
    - SKIN NEOPLASMS
        - CASE REPORT, 6442*

- TYROSINE
    - CARCINOEMBRYONIC ANTIGEN
        - CHEMICAL MODIFICATION, 6348
    - MELANOMA
        - GROWTH AND PIGMENTATION, REVIEW, 6600*

- TYROSINE AMINOTRANSFERASE
    - HEPATOMA
        - DEXAMETHASONE, 6583*, 6594*
        - INSULIN, 6583*

- ULTRAVIOLET RAYS
    - ANEMIA, APLASTIC
        - CHROMOSOME ABERRATIONS, 6434*
    - ANEMIA, HEMOLYTIC
        - DNA REPAIR, SPLEEN, 6238
    - ANTIBODIES
        - DNA REPAIR, 6254*
        - NUCLEOPROTEINS, 6254*
    - CAFFEINE
        - DNA REPAIR, 6256*
        - DOSE-RESPONSE STUDY, HAMSTER, 6256*
    - CARCINOMA, EPIDERMOID
        - ANTILYMPHOCYTE SERUM, 6264*
        - PURINE-6-THIOL, 6264*
    - CELL TRANSFORMATION, NEOPLASTIC
        - PHOTONS, ABSORPTION AND REEMISSION, 6269*
    - DNA
        - ADDUCT FORMATION, REVIEW, 6077*
        - MUTAGENIC ACTIVITY, REVIEW, 6043*
        - RADIATION EFFECTS, HAMSTER OVARY, MOUSE, 6261*
    - DNA REPAIR
        - CELL TRANSFORMATION, NEOPLASTIC, REVIEW, 6010
        - RADIATION-SENSITIZING AGENTS, 6256*
    - DNA REPLICATION
        - RADIATION EFFECTS, HAMSTER OVARY CELLS, 6253*
    - DNA, VIRAL
        - VIRUS REPLICATION, 6262*
    - ENDONUCLEASES
        - DNA REPLICATION, 6253*
    - ERYTHEMIA
        - PIGMENTATION, 6266*
    - GLUCOSEPHOSPHATE DEHYDROGENASE
        - LIPID PEROXIDATION, SKIN, 6235
    - HELA CELLS
        - DNA, 6261*
    - HODGKIN'S DISEASE
        - DNA REPAIR, SPLEEN, 6238
    - KERACYANIN
        - CELL CYCLE KINETICS, 6260*
    - L CELLS
        - KERACYANIN, 6260*
        - RADIO-PROTECTIVE AGENTS, 6260*
    - MELANIN
        - THYMINE DIMERS, 6236
    - MELANOMA
        - DOSE-RESPONSE STUDY, 6236
        - THYMINE DIMERS, 6236
    - NUCLEIC ACIDS
        - HYDROGEN BONDS, 6269*
    - POLYCYCLIC HYDROCARBONS
        - PHOTONS, ABSORPTION AND REEMISSION, 6269*
    - PROPANEDIAL
        - LIPID PEROXIDATION, SKIN, 6235
    - PURINES
        - DNA, PHOTOCHEMICAL REACTIONS, REVIEW, 6077*
    - PYRIMIDINES
        - ANTIBODIES, 6254*
        - DNA, PHOTOCHEMICAL REACTIONS, REVIEW, 6077*
        - DNA REPAIR, 6254*
    - SKIN NEOPLASMS
        - ANTILYMPHOCYTE SERUM, 6264*
        - CARCINOMA, 6266*
        - ERYTHEMIA, 6266*
        - OCCUPATIONAL HAZARD, REVIEW, 6002
        - PRECANCEROUS CONDITIONS, 6266*
        - PURINE-6-THIOL, 6264*
        - TANNING, 6266*
    - TEMPERTURE SENSITIVE MUTANTS
        - ISOLATION AND CHARACTERIZATION, HAMSTER OVARY, 6249*
    - THYMINE
        - DNA, PHOTOCHEMICAL REACTIONS, REVIEW, 6077*
    - URIDINE, 5-BROMO-2'-DEOXY-
        - TEMPERTURE SENSITIVE MUTANTS, 6249*
    - VIRUS, HERPES
        - DNA REPAIR, REVIEW, 6020
    - VIRUS, HERPES SIMPLEX 1
        - CELL TRANSFORMATION, NEOPLASTIC,

6317
VIRUS, HERPES SIMPLEX 2
    CELL TRANSFORMATION, NEOPLASTIC, 6317
VIRUS, SV40
    DNA REPLICATION, 6262*
    DNA, VIRAL, 6262*
    PYRIMIDINES, 6262*
XERODERMA PIGMENTOSUM
    CAFFEINE, 6247*
    DNA REPAIR, 6239, 6247*

URANIUM
  NEOPLASMS
    OCCUPATIONAL HAZARD, 6051*

UREA, 1-BUTYL-1-NITROSO-
  BONE MARROW CELLS
    CHROMOSOMES, 6219*
  LEUKEMIA, MYELOCYTIC
    NEOPLASM TRANSPLANTATION, 6484*
  LYMPHOCYTES
    CHROMOSOMES, 6219*

UREA, ETHYL NITROSO-
  BRAIN NEOPLASMS
    ACID PHOSPHATASE, 6157
    GLIOMA, 6157
  CELL TRANSFORMATION, NEOPLASTIC
    REVIEW, 6044*
  HEART NEOPLASMS
    HISTOLOGICAL STUDY, RAT, 6159
    NEOPLASMS, MULTIPLE PRIMARY, 6159
  NERVOUS SYSTEM NEOPLASMS
    NEOPLASM TRANSPLANTATION, 6053*
    REVIEW, 6053*
  OXIDOREDUCTASES
    REVIEW, 6042*

UREA, HYDROXY-
  QUINOLINE, 4-NITRO-, 1-OXIDE
    CELL TRANSFORMATION, NEOPLASTIC, 6209*
    DNA REPAIR, 6209*

UREA, METHYL NITROSO-
  CAFFEINE
    DNA REPAIR, 6222*
  HEART NEOPLASMS
    HISTOLOGICAL STUDY, RAT, 6159
    NEOPLASMS, MULTIPLE PRIMARY, 6159
  NERVOUS SYSTEM NEOPLASMS
    NEOPLASM TRANSPLANTATION, 6053*
    REVIEW, 6053*
  OXIDOREDUCTASES
    REVIEW, 6042*

UREA, N-METHYL-N-(4-PHENYLTHIAZOLYL)-
  BONE MARROW CELLS
    MUTAGENIC ACTIVITY, 6221*
  SPERMATOZOA
    MUTAGENIC ACTIVITY, 6221*

URIDINE, 5-BROMO-2'-DEOXY-
  CELLS, CULTURED
    DNA REPLICATION, 6579*
  DNA REPLICATION
    CHROMOSOMES, 6579*
  RADIATION, IONIZING
    TEMPERTURE SENSITIVE MUTANTS, 6249*
  ULTRAVIOLET RAYS
    TEMPERTURE SENSITIVE MUTANTS, 6249*

URIDINE, 2'-DEOXY-5-FLUORO-
  LEUKEMIA L1210
    DNA REPLICATION, 6580*

URIDINE, 2'-DEOXY-5-IODO-
  CELLS, CULTURED
    CELL TRANSIT TIME, 6509
    DNA REPLICATION, 6579*
  DNA REPLICATION
    CHROMOSOMES, 6579*
  VIRUS, C-TYPE RNA TUMOR
    VIRUS INDUCTION, 6296

UROGENITAL NEOPLASMS
  BREAST NEOPLASMS
    EPIDEMIOLOGY, CORRELATION STUDY, 6532*
  CARCINOGEN, CHEMICAL
    SYNERGISM, REVIEW, 6045*
  DIELDRIN
    FOOD CONTAMINATION, 6058*
  INCIDENCE RATES
    EPIDEMIOLOGY, INDIA, 6511
  MENINGES
    NEOPLASM METASTASIS, 6460*

UTERINE NEOPLASMS
  BLOOD GROUPS
    EPIDEMIOLOGY, 6510
  CARCINOMA
    CASE REPORT, 6108*
    DIAGNOSIS AND PROGNOSIS, 6526*
    REVIEW, 6108*
  CHORIOCARCINOMA
    EPIDEMIOLOGY, REVIEW, 6110*
  CONTRACEPTIVES, ORAL
    REVIEW, 6068*
  DIAGNOSIS AND PROGNOSIS
    REVIEW, 6108*
  ESTROGENS
    REVIEW, 6068*
    SERUM LEVELS, REVIEW, 6110*
  GONADOTROPINS, CHORIONIC
    SERUM LEVELS, REVIEW, 6110*
  HYDATIDIFORM MOLE
    EPIDEMIOLOGY, REVIEW, 6110*
  ISOANTIGENS
    BLOOD GROUPS, 6344
  ISOENZYMES
    ISOLATION AND CHARACTERIZATION, REVIEW, 6110*
  LEIOMYOMA
    CASE REPORT, 6476*
  MYOMA
    CASE REPORT, 6476*
  NEOPLASM METASTASIS
    EPIDEMIOLOGY, 6526*
  NEOPLASM RECURRENCE, LOCAL
    EPIDEMIOLOGY, 6526*
  NEOPLASMS, MULTIPLE PRIMARY
    LIPOMATOSIS, 6476*
  PLACENTAL LACTOGEN
    SERUM LEVELS, REVIEW, 6110*

- UVEITIS
  - NEPHRITIS, INTERSTITIAL
    - CASE REPORT, 6458*

- VALERIC ACID, 2,2-DIPHENYL-, 2-(DIETHYLAMINO)ETHYL ESTER HCL
  - DIMETHYLAMINE, N-NITROSO-
    - MUTAGENIC ACTIVITY, 6182*

- VINYL CHLORIDE
  - SEE ETHYLENE, CHLORO-

- VIRAL PROTEINS
  - CELL MEMBRANE
    - ISOLATION AND CHARACTERIZATION, 6023
  - PEPTIDES
    - ISOLATION AND CHARACTERIZATION, 6023
  - VIRUS, ADENO 2
    - CYCLOHEXIMIDE, 6306
    - ISOLATION AND CHARACTERIZATION, 6306
    - VIRUS REPLICATION, 6306
  - VIRUS, ADENO 5
    - HOST-RANGE MUTANTS, 6339*
    - TEMPERATURE SENSITIVE MUTANTS, 6339*
  - VIRUS, C-TYPE MURINE
    - VIRUS REPLICATION, 6290
  - VIRUS, CYTOMEGALO
    - ISOLATION AND CHARACTERIZATION, 6280
  - VIRUS, FELINE LEUKEMIA
    - ANTIBODY FORMATION, 6329*
  - VIRUS, MOLONEY MURINE LEUKEMIA
    - ISOLATION AND CHARACTERIZATION, 6333*
    - LEUCINE, 6333*
    - VIRUS REPLICATION, 6333*
  - VIRUS, MURINE CYTOMEGALO
    - ULTRASTRUCTURAL STUDY, 6283
  - VIRUS, MURINE LEUKEMIA
    - ANTIBODY FORMATION, 6329*
  - VIRUS, POLIO
    - ACETAMIDE, 2-IODO-, 6336*
    - ACETIC ANHYDRIDE, 6336*
    - IODINE, 6336*
  - VIRUS, RD-114
    - ANTIBODY FORMATION, 6329*
  - VIRUS, RHINO 2
    - ACETAMIDE, 2-IODO-, 6336*
    - ACETIC ANHYDRIDE, 6336*
    - IODINE, 6336*

- VIRUS, ADENO 2
  - CYCLOHEXIMIDE
    - VIRAL PROTEINS, 6306
  - DNA REPLICATION
    - ENDONUCLEASES, 6310
    - ORIGIN AND DIRECTION, 6310
    - TEMPERATURE SENSITIVE MUTANTS, 6307
  - DNA, VIRAL
    - GENOME MAPPING, REVIEW, 6080*
    - TEMPERATURE SENSITIVE MUTANTS, 6307
  - RNA, MESSENGER
    - DNA-RNA HYBRIDIZATION, 6308
    - ISOLATION AND CHARACTERIZATION, 6308
    - ULTRASTRUCTURAL STUDY, 6308
  - VIRAL PROTEINS
    - ISOLATION AND CHARACTERIZATION, 6306
    - VIRUS REPLICATION, 6306

- VIRUS, ADENO 5
  - CELL TRANSFORMATION, NEOPLASTIC
    - HOST-RANGE MUTANTS, 6339*
    - TEMPERATURE SENSITIVE MUTANTS, 6339*
  - DNA REPLICATION
    - HOST-RANGE MUTANTS, 6339*
    - TEMPERATURE SENSITIVE MUTANTS, 6339*
    - ULTRASTRUCTURAL STUDY, 6309
  - DNA, VIRAL
    - GENOME MAPPING, REVIEW, 6080*
    - ULTRASTRUCTURAL STUDY, 6309
  - VIRAL PROTEINS
    - HOST-RANGE MUTANTS, 6339*
    - TEMPERATURE SENSITIVE MUTANTS, 6339*

- VIRUS, ADENO 12
  - ANTIGENS, VIRAL
    - CELL TRANSFORMATION, NEOPLASTIC, 6342*
    - ISOLATION AND CHARACTERIZATION, 6342*

- VIRUS, AVIAN LEUKOSIS
  - HYPERGAMMAGLOBULINEMIA
    - ANTIBODY FORMATION, 6321*
    - IGG, 6321*
    - IMMUNE RESPONSE, 6321*
    - TRANSMISSION, CONGENITAL, 6321*

- VIRUS, AVIAN MYELOBLASTOSIS
  - DNA NUCLEOTIDYLTRANSFERASES
    - COBALT, 6578*
    - DNA REPLICATION, 6578*
    - MAGNESIUM, 6578*
    - MANGANESE, 6578*
    - NICKEL, 6578*
    - ZINC, 6578*
  - DNA REPLICATION
    - CATIONS, DIVALENT, 6578*
  - POLYRIBONUCLEOTIDES
    - REVERSE TRANSCRIPTASE, 6323*
  - VIRUS REPLICATION
    - CELLS, CULTURED, 6277

- VIRUS, AVIAN SARCOMA
  - DNA, CIRCULAR
    - ISOLATION AND CHARACTERIZATION, 6322*
    - ULTRASTRUCTURAL STUDY, 6322*
  - DNA, VIRAL
    - ISOLATION AND CHARACTERIZATION, 6322*
  - FIBROSARCOMA
    - DNA REPLICATION, 6322*

- VIRUS, BABOON C-TYPE RNA TUMOR
  - ANTIGENS, VIRAL
    - ANTIGENIC DETERMINANTS, 6335*

    - ISOLATION AND CHARACTERIZATION, 6335*
  - VIRUS, RD-114
    - ANTIGENIC DETERMINANTS, 6335*

- VIRUS, BOVINE LEUKEMIA
  - ANTIBODIES, VIRAL
    - ANTIGEN-ANTIBODY REACTIONS, 6303
    - IMMUNE SERUMS, 6303

- VIRUS, C-TYPE
  - LEUKEMIA
    - ANTIGENS, VIRAL, 6295
    - EPIDEMIOLOGY, MOUSE, 6295
  - LYMPHATIC NEOPLASMS
    - ANTIGENS, VIRAL, 6295
    - EPIDEMIOLOGY, MOUSE, 6295
  - MAMMARY NEOPLASMS, EXPERIMENTAL
    - ANTIGENS, VIRAL, 6295
    - EPIDEMIOLOGY, MOUSE, 6295
  - NEOPLASMS, CONNECTIVE TISSUE
    - ANTIGENS, VIRAL, 6295
    - EPIDEMIOLOGY, MOUSE, 6295

- VIRUS, C-TYPE MURINE
  - DNA, VIRAL
    - VIRUS REPLICATION, 6290
  - VIRAL PROTEINS
    - VIRUS REPLICATION, 6290

- VIRUS, C-TYPE RNA TUMOR
  - DEXAMETHASONE
    - ANTIGENS, VIRAL, 6296
    - VIRUS REPLICATION, 6296
  - INTERFERON
    - ANTIGENS, VIRAL, 6296
    - VIRUS REPLICATION, 6296
  - LUPUS ERYTHEMATOSUS, SYSTEMIC
    - ANTIGEN-ANTIBODY COMPLEX, 6319
    - ANTIGENS, VIRAL, 6319
  - URIDINE, 2'-DEOXY-5-IODO-
    - VIRUS INDUCTION, 6296

- VIRUS, CYTOMEGALO
  - CELLULAR INCLUSIONS
    - ISOLATION AND CHARACTERIZATION, 6280
  - VIRAL PROTEINS
    - ISOLATION AND CHARACTERIZATION, 6280

- VIRUS, DNA TUMOR
  - ANTIGENS, VIRAL
    - CELL TRANSFORMATION, NEOPLASTIC, REVIEW, 6087*
  - CELL MEMBRANE
    - CELL TRANSFORMATION, NEOPLASTIC, REVIEW, 6087*
  - DNA REPLICATION
    - CELL TRANSFORMATION, NEOPLASTIC, REVIEW, 6087*
  - HYBRID CELLS
    - CELL TRANSFORMATION, NEOPLASTIC, REVIEW, 6087*
  - KARYOTYPING
    - CELL TRANSFORMATION, NEOPLASTIC, REVIEW, 6087*
  - VIRUS REPLICATION
    - CELL TRANSFORMATION, NEOPLASTIC, REVIEW, 6087*
  - VIRUS, ROUS SARCOMA
    - DNA, VIRAL, 6298
    - RNA, MESSENGER, 6298
    - RNA, VIRAL, 6298

- VIRUS, EPSTEIN-BARR
  - ANTIBODIES, VIRAL
    - CELL TRANSFORMATION, NEOPLASTIC, 6314
    - IMMUNITY, CELLULAR, 6313
  - ANTIGENS, VIRAL
    - IMMUNITY, CELLULAR, 6313
    - LYMPHOCYTE TRANSFORMATION, 6313
    - SUPERINFECTION, RAJI CELLS, 6311
  - BURKITT'S LYMPHOMA
    - ANTIBODIES, VIRAL, 6340*
    - ANTIGEN-ANTIBODY REACTIONS, 6340*
    - ANTIGENS, VIRAL, 6341*
    - CASE REPORT, 6341*
    - DNA-DNA HYBRIDIZATION, REVIEW, 6018
    - DNA, VIRAL, 6341*
    - EPIDEMIOLOGY, REVIEW, 6082*
  - CELL LINE
    - LYMPHOCYTE TRANSFORMATION, 6312
    - VIRUS REPLICATION, 6312
  - CELLS, CULTURED
    - LYMPHOCYTE TRANSFORMATION, 6361
  - DNA, CIRCULAR
    - DNA REPLICATION, REVIEW, 6081*
  - DNA REPLICATION
    - SUPERINFECTION, RAJI CELLS, 6311
  - DNA, VIRAL
    - DNA-DNA HYBRIDIZATION, REVIEW, 6018
  - HISTOCOMPATIBILITY ANTIGENS
    - CELL TRANSFORMATION, NEOPLASTIC, 6380*
  - HYBRID CELLS
    - DNA REPLICATION, REVIEW, 6081*
  - INFECTIOUS MONONUCLEOSIS
    - ANTIGEN-ANTIBODY REACTIONS, 6315
    - IMMUNITY, CELLULAR, 6315
  - LEUKOCYTES
    - CELL TRANSFORMATION, NEOPLASTIC, 6314
    - TONSIL, 6314
  - LYMPHOCYTE TRANSFORMATION
    - ANTIGENS, VIRAL, 6312
    - VIRUS REPLICATION, 6312
  - LYMPHOCYTES
    - CELLS, CULTURED, REVIEW, 6097*
  - LYMPHOSARCOMA
    - ANTIBODIES, VIRAL, 6340*
  - NASOPHARYNGEAL NEOPLASMS
    - DNA-DNA HYBRIDIZATION, REVIEW, 6018
    - EPIDEMIOLOGY, REVIEW, 6082*
  - VIRUS REPLICATION
    - SUPERINFECTION, RAJI CELLS, 6311

- VIRUS, FELINE LEUKEMIA
  - ANTIGENS, VIRAL
    - ANTIGEN-ANTIBODY REACTIONS, 6329*
  - LEUKEMIA
    - ANTIGEN-ANTIBODY REACTIONS, 6329*
  - VIRAL PROTEINS
    - ANTIBODY FORMATION, 6329*

- VIRUS, FRIEND MURINE LEUKEMIA
  - ANEMIA, HEMOLYTIC, AUTOIMMUNE
    - ANTIGENIC DETERMINANTS, 6330*
    - AUTOANTIBODIES, 6330*
    - ERYTHROCYTES, 6330*
    - IMMUNE RESPONSE, 6330*
  - BONE MARROW CELLS
    - IMMUNE RESPONSE, 6328*
  - ERYTHROLEUKEMIA
    - IMMUNE RESPONSE, MOUSE, 6355
    - IMMUNITY, CELLULAR, 6355
    - IMMUNOSUPPRESSION, 6355
  - ERYTHROPOIESIS
    - VIRUS REPLICATION, 6287
  - HISTOCOMPATIBILITY ANTIGENS
    - VIRUS REPLICATION, 6331*
  - HYBRID CELLS
    - GLOBIN, 6576*
    - RNA, MESSENGER, 6576*
  - B-LYMPHOCYTES
    - LYMPHOCYTE TRANSFORMATION, 6328*
  - T-LYMPHOCYTES
    - LYMPHOCYTE TRANSFORMATION, 6328*
  - METHANE, SULFINYLBIS-
    - CELL CYCLE KINETICS, 6287
    - VIRUS REPLICATION, 6287
  - RNA REPLICATION
    - CELL CYCLE KINETICS, 6287
  - STRONTIUM RADIOISOTOPES
    - BONE MARROW CELLS, 6328*
    - IMMUNE RESPONSE, 6328*
    - LYMPHOCYTE TRANSFORMATION, 6328*
  - VIRUS REPLICATION
    - CELL CYCLE KINETICS, 6287

- VIRUS, GRAFFI MURINE LEUKEMIA
  - PHOSPHATASES
    - CELL TRANSFORMATION, NEOPLASTIC, 6454*
    - ULTRASTRUCTURAL STUDY, 6454*

- VIRUS, GROSS MURINE LEUKEMIA
  - HISTOCOMPATIBILITY ANTIGENS
    - IMMUNE RESPONSE, REVIEW, 6028
  - LEUKEMIA, LYMPHOBLASTIC
    - TISSUE DISTRIBUTION, 6285
  - THYMOMA
    - TISSUE DISTRIBUTION, 6285

- VIRUS, GUINEA PIG HERPES
  - FIBROSARCOMA
    - CELLULAR INCLUSIONS, 6300
    - HISTOPATHOLOGICAL STUDY, 6300
    - NEOPLASM METASTASIS, 6300

- VIRUS, HARVEY MURINE SARCOMA
  - VIRUS, MURINE LEUKEMIA
    - VIRUS REPLICATION, 6291

- VIRUS, HERPES
  - CELL TRANSFORMATION, NEOPLASTIC
    - DNA REPAIR, REVIEW, 6020
  - CERVIX NEOPLASMS
    - EPIDEMIOLOGY, REVIEW, 6085*
  - LIGHT
    - DNA REPAIR, REVIEW, 6020
  - RADIATION, IONIZING
    - DNA REPAIR, REVIEW, 6020
  - SKIN NEOPLASMS
    - CARCINOGENIC POTENTIAL, REVIEW, 6019
  - ULTRAVIOLET RAYS
    - DNA REPAIR, REVIEW, 6020

- VIRUS, HERPES SIMPLEX
  - SKIN NEOPLASMS
    - ISOLATION AND CHARACTERIZATION, REVIEW, 6019
  - THYMIDINE KINASE
    - VIRUS REPLICATION, REVIEW, 6079*

- VIRUS, HERPES SIMPLEX 1
  - CELLS, CULTURED
    - CELL TRANSFORMATION, NEOPLASTIC, 6317
    - THYMIDINE KINASE, 6317
  - DNA, VIRAL
    - ULTRASTRUCTURAL, REVIEW, 6083*
  - PEPTIDES
    - CARCINOGENIC POTENTIAL, 6083*
    - ISOLATION AND CHARACTERIZATION, REVIEW, 6083*
  - RNA, VIRAL
    - DNA-RNA HYBRIDIZATION, REVIEW, 6083*
  - ULTRAVIOLET RAYS
    - CELL TRANSFORMATION, NEOPLASTIC, 6317

- VIRUS, HERPES SIMPLEX 2
  - CELLS, CULTURED
    - CELL TRANSFORMATION, NEOPLASTIC, 6317
    - THYMIDINE KINASE, 6317
  - CERVIX NEOPLASMS
    - CARCINOGENIC POTENTIAL, REVIEW, 6017
  - ULTRAVIOLET RAYS
    - CELL TRANSFORMATION, NEOPLASTIC, 6317
  - ZINC SULFATE
    - DNA REPLICATION, 6316
    - PEPTIDES, 6316

- VIRUS, HUMAN EMBRYO LUNG 12
  - LUPUS ERYTHEMATOSUS, SYSTEMIC
    - ANTIGENS, VIRAL, 6319

- VIRUS, INFLUENZA
  - HYPERGAMMAGLOBULINEMIA
    - ANTIBODY FORMATION, 6321*

- VIRUS, JM-V HERPES
  - BONE MARROW CELLS
    - CHROMOSOME ABERRATIONS, 6324*
  - LEUKEMIA
    - CHROMOSOME ABERRATIONS, 6324*
  - LYMPHOCYTES
    - CHROMOSOME ABERRATIONS, 6324*

- VIRUS, KIRSTEN MURINE SARCOMA
  - VIRUS, MURINE LEUKEMIA
    - VIRUS REPLICATION, 6291

- VIRUS-LIKE PARTICLES
  - LEUKEMIA, LYMPHOBLASTIC
    - ULTRASTRUCTURAL STUDY, 6455*
  - PAPILLOMA

        - FISHES, 6334*
        - ULTRASTRUCTURAL STUDY, EEL, 6325*
    - SARCOMA, OSTEOGENIC
        - TRANSPLANTATION, HETEROLOGOUS, 6327*
        - TUBULORETICULAR STRUCTURES, 6327*
        - ULTRASTRUCTURAL STUDY, 6327*
    - SEBACEOUS GLAND NEOPLASMS
        - ADENOMA, 6299

- VIRUS, MAREK'S DISEASE HERPES
    - ANTIBODIES, VIRAL
        - IMMUNE RESPONSE, REVIEW, 6015
    - ANTIGENS, NEOPLASM
        - IMMUNITY, CELL-MEDIATED, REVIEW, 6015
    - ANTIGENS, VIRAL
        - IMMUNITY, CELL-MEDIATED, REVIEW, 6015
    - CELL TRANSFORMATION, NEOPLASTIC
        - REVIEW, 6086*
    - GENETICS
        - IMMUNE RESPONSE, REVIEW, 6015
    - VIRUS REPLICATION
        - REVIEW, 6036*
    - VIRUS, RNA TUMOR
        - VIRUS REPLICATION, 6078*

- VIRUS, MENGO
    - PEPTIDES
        - AMINO ACIDS, 6326*
        - ISOLATION AND CHARACTERIZATION, 6326*
    - TERATOID TUMOR
        - VIRUS, SV40, 6488*

- VIRUS, MOLONEY MURINE LEUKEMIA
    - HISTOCOMPATIBILITY ANTIGENS
        - VIRUS REPLICATION, 6331*
    - STREPTOVARICINS
        - VIRUS REPLICATION, REVIEW, 6079*
    - VIRAL PROTEINS
        - ISOLATION AND CHARACTERIZATION, 6333*
        - LEUCINE, 6333*
        - VIRUS REPLICATION, 6333*
    - VIRUS, MOLONEY MURINE SARCOMA-LEUKEMIA
        - DNA-RNA HYBRIDIZATION, 6289

- VIRUS, MOLONEY MURINE SARCOMA
    - ANTIGENS, NEOPLASM
        - IMMUNITY, CELLULAR, 6332*
    - T-LYMPHOCYTES
        - ANTILYMPHOCYTE SERUM, 6332*
        - IMMUNE RESPONSE, 6332*
        - RADIATION, IONIZING, 6332*
    - VIRUS, MURINE LEUKEMIA
        - VIRUS REPLICATION, 6291

- VIRUS, MOLONEY MURINE SARCOMA-LEUKEMIA
    - RNA, VIRAL
        - ISOLATION AND CHARACTERIZATION, 6289
        - POLY A, 6289
    - VIRUS, MOLONEY MURINE LEUKEMIA
        - DNA-RNA HYBRIDIZATION, 6289

- VIRUS, MURINE CYTOMEGALO
    - CENTRIFUGATION
        - VIRUS REPLICATION, 6286
    - VIRAL PROTEINS
        - ULTRASTRUCTURAL STUDY, 6283

- VIRUS, MURINE LEUKEMIA
    - ANTIGENS, VIRAL
        - AGE FACTORS, 6346
        - T-LYMPHOCYTES, 6346
        - PRECANCEROUS CONDITIONS, 6346
    - CELL MEMBRANE
        - ANTIGEN-ANTIBODY COMPLEX, 6331*
        - ANTIGENS, 6331*
        - HISTOCOMPATIBILITY ANTIGENS, 6331*
    - CELL TRANSFORMATION, NEOPLASTIC
        - IMMUNOSUPPRESSION, REVIEW, 6091*
    - COMPLEMENT
        - VIRUS REPLICATION, 6282
    - GENETICS
        - HISTOCOMPATIBILITY ANTIGENS, 6292
        - IMMUNE RESPONSE, MOUSE, 6292
    - HISTOCOMPATIBILITY ANTIGENS
        - AGE FACTORS, 6346
        - IMMUNE RESPONSE, MOUSE, 6292
        - T-LYMPHOCYTES, 6346
        - PRECANCEROUS CONDITIONS, 6346
        - VIRUS REPLICATION, 6331*
    - ISOANTIGENS
        - AGE FACTORS, 6346
        - T-LYMPHOCYTES, 6346
        - PRECANCEROUS CONDITIONS, 6346
    - T-LYMPHOCYTES
        - ANTIGENS, 6331*
    - PROSTATIC NEOPLASMS
        - DNA-RNA HYBRIDIZATION, 6318
        - REVERSE TRANSCRIPTASE, 6318
    - REVERSE TRANSCRIPTASE
        - SERUM, HUMAN, 6282
    - VIRAL PROTEINS
        - ANTIBODY FORMATION, 6329*
    - VIRUS, AMPHOTROPIC
        - ISOLATION AND CHARACTERIZATION, 6294
    - VIRUS, HARVEY MURINE SARCOMA
        - VIRUS REPLICATION, 6291
    - VIRUS, KIRSTEN MURINE SARCOMA
        - VIRUS REPLICATION, 6291
    - VIRUS, MOLONEY MURINE SARCOMA
        - VIRUS REPLICATION, 6291
    - VIRUS REPLICATION
        - HOST RANGE, AMPHOTROPIC VIRUS, 6293, 6294

- VIRUS, MURINE MAMMARY TUMOR
    - MAMMARY NEOPLASMS, EXPERIMENTAL
        - IMMUNE RESPONSE, REVIEW, 6027

- VIRUS, MURINE SARCOMA
    - CELL TRANSFORMATION, NEOPLASTIC
        - IMMUNOSUPPRESSION, REVIEW, 6091*
    - CORTICOSTERONE
        - CELL TRANSFORMATION, NEOPLASTIC, REVIEW, 6016
    - RETINOL
        - CELL TRANSFORMATION, NEOPLASTIC, REVIEW, 6016
    - STRESS
        - CELL TRANSFORMATION, NEOPLASTIC, REVIEW, 6016

- VIRUS, NEWCASTLE DISEASE
  - IMMUNE RESPONSE
    - REVIEW, 6022

- VIRUS, PAPILLOMA
  - SKIN NEOPLASMS
    - ISOLATION AND CHARACTERIZATION, REVIEW, 6019

- VIRUS, PAPOVA
  - BRAIN NEOPLASMS
    - SARCOMA, RETICULUM CELL, 6337*
  - EPENDYMOMA
    - ANTIGENS, NEOPLASM, 6337*
  - VIRUS, SV40
    - ANTIGEN-ANTIBODY REACTIONS, 6337*

- VIRUS, POLIO
  - ACETAMIDE, 2-IODO-
    - VIRAL PROTEINS, 6336*
  - ACETIC ANHYDRIDE
    - VIRAL PROTEINS, 6336*
  - IODINE
    - VIRAL PROTEINS, 6336*

- VIRUS, POLYOMA
  - CELL TRANSFORMATION, NEOPLASTIC
    - IMMUNOSUPPRESSION, REVIEW, 6091*
  - TERATOID TUMOR
    - VIRUS REPLICATION, 6488*
  - VIRUS, RAUSCHER MURINE LEUKEMIA
    - CELL DIFFERENTIATION, 6288

- VIRUS, RAUSCHER MURINE LEUKEMIA
  - CELLS, CULTURED
    - CELL DIFFERENTIATION, 6288
  - PHOSPHATASES
    - CELL TRANSFORMATION, NEOPLASTIC, 6454*
    - ULTRASTRUCTURAL STUDY, 6454*
  - RNA, MESSENGER
    - CELL TRANSFORMATION, NEOPLASTIC, 6284
  - RNA, RIBOSOMAL
    - CELL TRANSFORMATION, NEOPLASTIC, 6284
  - RNA, VIRAL
    - CELL TRANSFORMATION, NEOPLASTIC, 6284
  - SPLEEN
    - CELL DIFFERENTIATION, 6288
  - THYMUS GLAND
    - CELL DIFFERENTIATION, 6288
  - VIRUS, POLYOMA
    - CELL DIFFERENTIATION, 6288
  - VIRUS REPLICATION
    - CELL DIFFERENTIATION, 6288

- VIRUS, RD-114
  - VIRAL PROTEINS
    - ANTIBODY FORMATION, 6329*
  - VIRUS, BABOON C-TYPE RNA TUMOR
    - ANTIGENIC DETERMINANTS, 6335*

- VIRUS REPLICATION
  - ONCOGENIC VIRUSES
    - COMPLEMENT, 6282
  - TERATOID TUMOR
    - CELL DIFFERENTIATION, 6488*
    - VIRUS, POLYOMA, 6488*
    - VIRUS, SV40, 6488*
  - ULTRAVIOLET RAYS
    - DNA, VIRAL, 6262*
  - VIRUS, ADENO 2
    - VIRAL PROTEINS, 6306
  - VIRUS, AVIAN MYELOBLASTOSIS
    - CELLS, CULTURED, 6277
  - VIRUS, C-TYPE MURINE
    - DNA, VIRAL, 6290
    - VIRAL PROTEINS, 6290
  - VIRUS, C-TYPE RNA TUMOR
    - DEXAMETHASONE, 6296
    - INTERFERON, 6296
  - VIRUS, DNA TUMOR
    - CELL TRANSFORMATION, NEOPLASTIC, REVIEW, 6087*
  - VIRUS, EPSTEIN-BARR
    - CELL LINE, 6312
    - LYMPHOCYTE TRANSFORMATION, 6312
    - SUPERINFECTION, RAJI CELLS, 6311
  - VIRUS, FRIEND MURINE LEUKEMIA
    - CELL CYCLE KINETICS, 6287
    - ERYTHROPOIESIS, 6287
    - HISTOCOMPATIBILITY ANTIGENS, 6331
    - METHANE, SULFINYLBIS-, 6287
  - VIRUS, HARVEY MURINE SARCOMA
    - VIRUS, MURINE LEUKEMIA, 6291
  - VIRUS, KIRSTEN MURINE SARCOMA
    - VIRUS, MURINE LEUKEMIA, 6291
  - VIRUS, MAREK'S DISEASE HERPES
    - REVIEW, 6086*
    - VIRUS, RNA TUMOR, 6078*
  - VIRUS, MOLONEY MURINE LEUKEMIA
    - HISTOCOMPATIBILITY ANTIGENS, 6331
    - VIRAL PROTEINS, 6333*
  - VIRUS, MOLONEY MURINE SARCOMA
    - VIRUS, MURINE LEUKEMIA, 6291
  - VIRUS, MURINE CYTOMEGALO
    - CENTRIFUGATION, 6286
  - VIRUS, MURINE LEUKEMIA
    - COMPLEMENT, 6282
    - HISTOCOMPATIBILITY ANTIGENS, 6331
    - HOST RANGE, AMPHOTROPIC VIRUS, 6293, 6294
  - VIRUS, RAUSCHER MURINE LEUKEMIA
    - CELL DIFFERENTIATION, 6288

- VIRUS, RHINO 2
  - ACETAMIDE, 2-IODO-
    - VIRAL PROTEINS, 6336*
  - ACETIC ANHYDRIDE
    - VIRAL PROTEINS, 6336*
  - IODINE
    - VIRAL PROTEINS, 6336*

- VIRUS, RNA TUMOR
  - CELL TRANSFORMATION, NEOPLASTIC
    - TISSUE CULTURE, REVIEW, 6137*
  - CHROMOSOMES
    - CELL TRANSFORMATION, NEOPLASTIC, REVIEW, 6120*
  - FISHES
    - MONITORING SYSTEMS, REVIEW, 6065
  - MELANOMA
    - ETIOLOGY, REVIEW, 6600*
  - VIRUS, MAREK'S DISEASE HERPES
    - VIRUS REPLICATION, 6078*

- VIRUS, ROUS SARCOMA
  - ACTINOMYCIN
    - PLASMINOGEN, 6590*
  - CELL MEMBRANE
    - PHOSPHOLIPIDS, 6281
  - CYCLOHEXIMIDE
    - PLASMINOGEN, 6590*
  - DNA, VIRAL
    - DNA-RNA HYBRIDIZATION, 6298
  - GLUCOSE, 2-DEOXY-
    - CELL TRANSFORMATION, NEOPLASTIC, 6281
  - GLYCOPROTEINS
    - ALCOHOL OXIDOREDUCTASES, 6279
    - CELL TRANSFORMATION, NEOPLASTIC, 6279
    - PERIODIC ACID, 6279
    - PEROXIDASES, 6279
    - PYRIDOXAL, 5-(DIHYDROGEN PHOSPHATE), 6279
  - IMMUNE SERUMS
    - BLOCKING ACTIVITY, 6278
  - NEOPLASM REGRESSION, SPONTANEOUS
    - IMMUNITY, CELLULAR, 6278
  - PHOSPHOLIPIDS
    - ACYL GROUP COMPOSITION, 6281
    - CELL TRANSFORMATION, NEOPLASTIC, 6281
  - PLASMINOGEN
    - CELL TRANSFORMATION, NEOPLASTIC, 6590*
  - RNA REPLICATION
    - PLASMINOGEN, 6590*
  - RNA, VIRAL
    - DNA-RNA HYBRIDIZATION, 6298
  - SARCOMA
    - IMMUNITY, CELLULAR, 6278
  - VIRUS, DNA TUMOR
    - DNA, VIRAL, 6298
    - RNA, MESSENGER, 6298
    - RNA, VIRAL, 6298

- VIRUS, SV40
  - ANTIGENS
    - CELL TRANSFORMATION, NEOPLASTIC, 6297
    - ISOLATION AND CHARACTERIZATION, 6297
  - BCG VACCINATION
    - IMMUNE RESPONSE, 6378
    - TRANSPLANTATION IMMUNOLOGY, 6378
  - CELL MEMBRANE
    - CELL TRANSFORMATION, NEOPLASTIC, 6589*
  - CELL TRANSFORMATION, NEOPLASTIC
    - CELL FUSION, 6338*
    - PROTEASE INHIBITORS, REVIEW, 6526*
  - DNA, CIRCULAR
    - NUCLEOPROTEINS, 6305
  - DNA, VIRAL
    - CLEAVAGE MAP, TEMPERATURE SENSITIVE MUTANTS, 6304
    - RNA POLYMERASE, 6301
    - VIRUS, RESCUE, TEMPERATURE SENSITIVE MUTANTS, 6304
  - EGG PROTEINS
    - AGGLUTINATION, REVIEW, 6526*
    - CELL DIVISION, REVIEW, 6526*
  - GUANIDINE
    - NUCLEOPROTEINS, 6305
  - HYBRID CELLS
    - DNA REPLICATION, 6338*
    - HYPOXANTHINE PHOSPHORIBOSYLTRANSFERASE, 6338*
    - OSTEOGENESIS, 6428
    - OUABAIN RESISTANCE, 6338*
  - HYDROCHLORIC ACID
    - NUCLEOPROTEINS, 6305
  - NEOPLASMS, EXPERIMENTAL
    - TRANSPLANTATION IMMUNOLOGY, 6378
  - NUCLEOPROTEINS
    - ISOLATION AND CHARACTERIZATION, 6305
    - RNA POLYMERASE, 6301
    - RNA REPLICATION, 6301
    - ULTRASTRUCTURAL STUDY, 6305
  - PHOSPHOPROTEINS
    - CELL TRANSFORMATION, NEOPLASTIC, 6589*
  - 1,3-PROPANEDIOL, 2-AMINO-2-(HYDROXYMETHYL)-
    - RNA REPLICATION, 6301
  - PROTEIN KINASE
    - CELL TRANSFORMATION, NEOPLASTIC, 6589*
  - RNA, MESSENGER
    - ANTIGENS, 6297
  - RNA POLYMERASE
    - ISOLATION AND CHARACTERIZATION, 6301
  - SERUM
    - CELL CYCLE KINETICS, 6544
    - CELL TRANSFORMATION, NEOPLASTIC, 6544
  - TERATOID TUMOR
    - VIRUS, MENGO, 6488*
    - VIRUS REPLICATION, 6488*
  - THREITOL, 1,4-DITHIO-
    - NUCLEOPROTEINS, 6305
    - RNA REPLICATION, 6301
  - TOLUENE, 2,4,6-TRINITRO-
    - RNA REPLICATION, 6301
  - ULTRAVIOLET RAYS
    - DNA REPLICATION, 6262*
    - DNA, VIRAL, 6262*
    - PYRIMIDINES, 6262*
    - DNA REPLICATION, 6262*
    - DNA, VIRAL, 6262*
    - PYRIMIDINES, 6262*
  - VIRUS, PAPOVA
    - ANTIGEN-ANTIBODY REACTIONS, 6337*

- VIRUS, VARICELLA-ZOSTER
  - SKIN NEOPLASMS
    - ISOLATION AND CHARACTERIZATION, REVIEW, 6019

- VITAMIN B12
  - LEUKEMIA, MYELOCYTIC
    - DIAGNOSIS AND TREATMENT, REVIEW, 6128*

- WARTS
  - GLYCERALDEHYDEPHOSPHATE DEHYDROGENASE
    - FLUOROMETRY, 6586*
  - PHOSPHOGLYCERATE KINASE
    - FLUOROMETRY, 6586*
  - PHOSPHOGLYCEROMUTASE

        FLUOROMETRY, 6586*
    PHOSPHOPYRUVATE HYDRATASE
        FLUOROMETRY, 6586*
    PYRUVATE KINASE
        FLUOROMETRY, 6586*

WATER POLLUTANTS
    BENZENE
        DISTRIBUTION, REVIEW, 6064*
    BENZENE, HEXACHLORO-
        DISTRIBUTION, REVIEW, 6064*
    CARBAMIC ACID, DIETHYLDITHIO-,
      2-CHLOROALLYL ESTER
        DISTRIBUTION, REVIEW, 6064*
    CARBAMIC ACID, DIISOPROPYLTHIO-,
      S-[2,3-DICHLOROALLYL] ESTER
        DISTRIBUTION, REVIEW, 6064*
    CARBON TETRACHLORIDE
        DISTRIBUTION, REVIEW, 6064*
    CHLOROFORM
        DISTRIBUTION, REVIEW, 6064*
    ETHANE, 1,1,1-TRICHLORO-2,2-BIS[P-
      CHLOROPHENYL]-
        CARCINOGENIC POTENTIAL, FISH,
          6524*
    ETHANE, 1,1,1-TRICHLORO-2,2-BIS[P-
      METHOXYPHENYL]-
        DISTRIBUTION, REVIEW, 6064*
    ETHER, BIS[2-CHLOROETHYL]-
        DISTRIBUTION, REVIEW, 6064*
    ETHYLENE, CHLORO-
        DISTRIBUTION, REVIEW, 6064*
    2-IMIDAZOLIDINETHIONE
        DISTRIBUTION, REVIEW, 6064*
    TRACE ELEMENTS
        CARCINOGENIC POTENTIAL, FISH,
          6524*

WOOD
    NOSE NEOPLASMS
        OCCUPATIONAL HAZARD, REVIEW, 6001

WOUNDS AND INJURIES
    FACIAL NEOPLASMS
        CARCINOMA, 6396
        CARCINOMA, EPIDERMOID, 6396
        CASE REPORT, 6396
        FIBROSARCOMA, 6396
        NEUROFIBROMA, 6396
    MOUTH NEOPLASMS
        FISHES, 6523*
    SKIN NEOPLASMS
        OCCUPATIONAL HAZARD, REVIEW, 6002

XERODERMA PIGMENTOSUM
    BLOOD GROUPS
        DNA REPAIR, 6118*
        EPIDEMIOLOGY, 6118*
    CAFFEINE
        DNA REPAIR, 6247*
    GASTROINTESTINAL NEOPLASMS
        CHROMOSOME ABNORMALITIES, REVIEW
          6121*
    GENETICS
        DNA REPAIR, 6239
    LEUKEMIA
        CHROMOSOME ABNORMALITIES, REVIE
          6121*
    ULTRAVIOLET RAYS
        CAFFEINE, 6247*
        DNA REPAIR, 6239, 6247*

ZINC
    ENVIRONMENTAL HAZARD
        CARCINOGENIC POTENTIAL, 6063*
    HEPATOMA
        BENZENAMINE, N,N-DIMETHYL-4-[[3-
          METHYLPHENYL]AZO]-, 6577*
        DNA NUCLEOTIDYLTRANSFERASES, 65
        DNA REPLICATION, 6577*
        THYMIDINE KINASE, 6577*
    NEOPLASMS
        METABOLISM, REVIEW, 6063*
    VIRUS, AVIAN MYELOBLASTOSIS
        DNA NUCLEOTIDYLTRANSFERASES, 65

ZINC SULFATE
    VIRUS, HERPES SIMPLEX 2
        DNA REPLICATION, 6316
        PEPTIDES, 6316

CHEMICAL ABSTRACT SERVICES REGISTRY NUMBER INDEX

CAS REGISTRY NUMBER   ABSTRACT NUMBER

35256 6571

50022 6296

50180 6166

50226 6016

50282 6568

50328 .... 6004, 6145, 6146, 6147, 6148

50339 6166

50760 6551

50997 6573

51285 6352

51752 6153

52904 6551

53032 6395

53065 6428

53703 6147

53792 6558

53952 6142

53963 6141

54126 6348

54422 .... 6296, 6509

54477 6279

54886 6144

55185 .... 6138, 6160

56495 .... 6155, 6373

56531 .... 6001, 6009

57885 6575

58082 6010

59303 6152

59518 6551

59892 6138

60117 6143

60184 6348

60242 6551

62759 .... 6138, 6161

64175 .... 6503, 6504, 6551

65861 6554

66717 6416

66819 .... 6167, 6306

67685 6287

68268 .... 6016, 6394

69658 .... 6166, 6167

70188 6551

70257 .... 6156, 6559

CHEMICAL ABSTRACT SERVICES REGISTRY NUMBER INDEX

CAS REGISTRY NUMBER	ABSTRACT NUMBER
73223	6348
75014	6003, 6005, 6138, 6154
77861	6301
91203	6516
95807	6150
98895	6162
102716	6155
107324	6348
111308	6345
113008	6305
118967	6301
123751	6165
127333	6549
138590	6162
145131	6566
147853	6165
206440	6147
305033	6167
319846	6158
431038	6348
446866	6166, 6167, 6395
509148	6348
542789	6235
604591	6146
621647	6163
671169	6166, 6167
684935	6159
759739	6157, 6159
930552	6165
1162658	6139, 6140, 6147
1309337	6232
1332214	6003, 6011, 6514, 651
1385951	6139
2466764	6348
2508192	6345
3483123	6301, 6305, 6551
5960918	6153
6898948	6551
7439896	6164
7440020	6003, 6006
7440122	6232
7440382	6002, 6003, 6006
7440473	6003, 6006
7440575	6166

CHEMICAL ABSTRACT SERVICES REGISTRY NUMBER INDEX

CAS REGISTRY NUMBER	ABSTRACT NUMBER
7440702	3738
7519360	6165
7631869	6232
7646799	6160
7647010	6305
7693529	6348
7733020	6316
7758976	6006
7758987	6160
7778430	6547
7782776	6165
8001589	6004
8002037	6143
8002059	6004
8063943	6005
9002862	6005
9004108	6564
9005792	6572, 6573
9008111	6296
10060089	6006
12001284	6003, 6011, 6514, 6517
12001295	6003, 6011, 6514, 6517
12035722	6006
12172735	6003, 6011, 6514, 6517
13929356	6557
14265442	6567
16096972	6301, 6305, 6551
16812547	6006
17068789	6003, 6011, 6514, 6517
21150209	6557
21416875	6416
25013165	6146
90004540	6366, 6368

LN	ABSTRACT NUMBER
S	6002, 6003, 6006
U	6166
A	3738
A.CR-02-Q2 QH2	6006
O..G2	6160
R	6003, 6006
U..S-04	6160
E	6164
I	6003, 6006
I3.S2	6006
B.CR-02-Q2	6006
M	6232
I..02	6232
N..S-04	6316
	6305
U1	6003, 6005, 6138, 6154
N1&2G	6153
B656 HHJ EMV1	6141
B656 HHJ ENQV1	6142
C6566 1A PJ	6147
D6 B6666 2AB TJ	6004, 6145, 6146, 6147, 6148

WLN	ABSTRACT NUMBER
L E5 B666 LUTJ A E FY&3Y OQ -B&AEFO	6575
L E5 B666TTT&J E FQ OQ	6568
L E6 C666 BV FV CU GUTTT&J DQ EQ GVZ HQ IN1&1 MQ OG RQ	6549
L E6 D6656 1A T&&&T&J R	6155, 6373
L G6 D6 B666J	6147
L6TJ AG BG CG DG EG FG *ALPHA	6158
L6UTJ A BL/U1Y&U2/ 2Q C C -T	6016, 6394
L6UTJ AVQ CQ DQ EQ	6162
L66J	6516
NA2 AS-O-Q3	6547
ONN1&1	6138, 6161
ONN2&2	6138, 6160
ONN3&3	6163
ONO	6165
OS1&1	6287
QR DY2& 2U	6009
QV3R DN2G2G	6167
Q2	6503, 6504, 6551
Q2N2Q2Q	6155
SH2Q	6551
T C666 BO EV INJ D FZ N G- K-/VM- OT516- AN FVN IVN LVO PVM SVTJ G J KY N RY 2	6551

WISWESSER LINE NOTATION INDEX

WLN	ABSTRACT NUMBER
T F5 C6 B655 DOV GV OO QO RUT&&TTJ LO1	6139, 6140, 6147
T5MTJ	6165
T5NTJ .ANO	6165
T5VNNV EHJ BR& CR& E4	6166
T56 BN DN FN HNJ IN1&1 D- BT5OTJ CQ DMVYZ1R DO1& E1Q	6558
T56 BN DN FNVNVJ B F H	6010
T6MPOTJ BO BN2G2	6166
T6N DOTJ ANO	6138
T6NVMVJ EI A- ET5OTJ B1Q CQ -A&C	6509
T6VMVTJ E1YQ- BL6VTJ D F	6167, 6306
T66 BM DN FN HNJ IS- ET5N ONJ DNW	6166
T66 BN DN GN JNJ CZ EQ H1MR DVMYVQ2VQ	6152
VH1VH	6235
VH3VH	6345
WN 4X	6348
WNMYUM&N1&NO	6156, 6559
WNR B CNW ENW	6301
WNR BQ ENW	6352
ZR CZD	6150
ZVN1&NO*	6159
ZVN2&NO	6157
ZYZUM	6305
1N1&R C DNUNR	6144
1N1&R DNUNR	6143
1VV1	6348
1Y&MVR D1MM1	6166, 6167

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PREFACE

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NOTE

Journal names are abbreviated according to the list of abbreviations used by *Index Medicus*. For journals not covered by *Index Medicus*, the abbreviations found in *Chemical Abstracts Service Source Index*, 1907-1974 Cumulative, are used. New journals are verified in *New Serial Titles* and abbreviated according to *International Standard ISO 833*. An asterisk indicates the author to address (other than the primary) in requesting reprints.

LANGUAGE ABBREVIATIONS

Afr.	Afrikaans
Ara.	Arabic
Bul.	Bulgarian
Chi.	Chinese
Cro.	Croation
Cze.	Czech
Dan.	Danish
Dut.	Dutch
Eng.	English
Est.	Estonian
Fin.	Finnish
Fle.	Flemish
Fre.	French
Geo.	Georgian
Ger.	German
Gre.	Greek
Heb.	Hebrew
Hun.	Hungarian
Ice.	Icelandic
Ind.	Indonesian
Ita.	Italian
Jpn.	Japanese
Kor.	Korean
Lav.	Latvian
Lit.	Lithuanian
Nor.	Norwegian
Pol.	Polish
Por.	Portuguese
Rum.	Rumanian
Rus.	Russian
Ser.	Serbo-Croatian
Slo.	Slovak
Spa.	Spanish
Swe.	Swedish
Tha.	Thai
Tur.	Turkish
Ukr.	Ukrainian
Vie.	Vietnamese

ABBREVIATIONS USED IN ABSTRACTS

A	angstrom(s)
ACTH	adrenocorticotropic hormone
ADP	adenosine diphosphate
AMP	adenosine monophosphate
ATP	adenosine triphosphate
approx	approximately
av	average
BCG	bacillus Calmette-Guerin
bid	twice daily
C	degree(s) centigrade
cal	calorie(s)
kcal	kilocalorie(s)
cc	cubic centimeter(s)
Ci	curie(s)
mCi	millicurie(s)
μCi	microcurie(s)
cm	centimeter(s)
CNS	central nervous system
cpm	counts per minute
DNA	deoxyribonucleic acid
ED$_{50}$	median effective dose
EDTA	ethylenediamine tetraacetic acid
g	gram(s)
kg	kilogram(s)
mg	milligram(s)
μg	microgram(s)
Hb	hemoglobin
hr	hour(s)
ia	intra-arterial
id	intradermal
ILS	increased life span
im	intramuscular
ip	intraperitoneal
IU	International Unit(s)
iv	intravenous
Km	Michaelis constant
LD	lethal dose
LD$_{50}$	median lethal dose
M	molar
μM	micromolar
mOsm	milliosmolar
max	maximum
mEq	milliequivalent(s)
min	minute(s)
ml	milliliter
μl	microliter(s)
mm	millimeter(s)
mo	month(s)
N	normal concentration
NAD	nicotinamide adenine dinucleotide
NADH	reduced nicotinamide adenine dinucleotide
NADP	nicotinamide adenine dinucleotidephosphate
NADPH	reduced nicotinamide adenine dinucleotidephosphate
NCI	National Cancer Institute
NIH	National Institutes of Health
PAS	periodic acid--Schiff
po	orally
ppb	parts per billion
ppm	parts per million
R	roentgen
RBC	red blood cells (erythrocytes)
RNA	ribonucleic acid
rpm	revolutions per minute
sc	subcutaneous
sec	second(s)
SGOT	serum glutamic-oxalacetic transaminase
SGPT	serum glutamic-pyruvic transaminase
soln	solution
TCD	tissue culture dose
TCD$_{50}$	median tissue culture dose
tid	three times daily
UV	ultraviolet
WBC	white blood cells (leukocytes)
wk	week(s)
wt	weight
x	times
yr	year(s)

CONTENTS

	Cross Reference Abbreviations	Abstracts, Citations	Page
REVIEW	(Rev)	6601-6664	1025
CHEMICAL CARCINOGENESIS	(Chem)	6665-6792	1037
PHYSICAL CARCINOGENESIS	(Phys)	6793-6827	1056
VIRAL CARCINOGENESIS	(Viral)	6828-6917	1060
IMMUNOLOGY	(Immun)	6918-6955	1074
PATHOGENESIS	(Path)	6956-7097	1080
EPIDEMIOLOGY AND BIOMETRY	(Epid-Biom)	7098-7151	1099
MISCELLANEOUS	(Misc)	7152-7200	1107
AUTHOR INDEX			
SUBJECT INDEX			
CHEMICAL ABSTRACT SERVICES REGISTRY NUMBER INDEX			
WISWESSER LINE NOTATION INDEX			

601 THE IARC PROGRAM ON THE EVALUATION OF THE CARCINOGENIC RISK OF CHEMICALS TO MAN.

Eng.) Tomatis, L. (International Agency for Res. on ancer, 69008 Lyon, France). *Ann NY Acad Sci* 271: 96-409; 1976.

o evaluate the carcinogenic risk of chemicals to an, the International Agency for Research on Cancer s producing monographs on individual chemicals that onsist of data on use and production, carcinogenicity in experimental animals, epidemiological studies nd case reports, and other biological data such as etabolism and mutagenicity. They conclude with a alanced evaluation of all the data made by an interational group of experts. The chemicals were seleced among those for which some evidence or suspicion f carcinogenicity in experimental animals and/or an exists and to which humans are exposed. Of the 96 compounds evaluated, 17 were found to be assoiated with cancer in man. Ninety-four compounds ere definitely carcinogenic in experimental animals, nd 41 had a limited carcinogenic effect. Several of he chemicals carcinogenic in experimental animals re produced in very large quantities. The type of xposure to the 17 carcinogens was occupational for 4, medicinal for 2, and dietary for 1. (23 refernces)

602 STRAIN DIFFERENCE IN NATURAL INCIDENCE AND RESPONSE TO CARCINOGENS.

(Eng.) Grasso, .; Hardy, J. *In: Mouse Hepatic Neoplasia. Proceedngs of a Workshop held at the H.T.S. Management entre, Lane End, High Wycombe (Great Britain), 2-17 May 1974.* Butler, W. H.; Newberne, P. M., ds. (New York: Elsevier Scientific Publishing Co.): p. 111-132; 1975.

tudies on the natural incidence of liver tumors in arious strains of mice, the chemical induction of epatic lesions, and factors involved in both are eviewed. The strains and substrains of mice most rone to the development of hepatomas are: C3H, CBA, F1, and CF-LP. The incidence was always greater in ales, varying between 2:1 to 4:1, but in some C57BL ubstrains the ratio was even greater, indicating a ossible hormonal factor. Tumor incidence seems to egin between the 50th and 60th weeks. Several comounds are carcinogenic to the mouse liver, and ifferences can be observed in the type of tumors nduced in various strains by the same compound. igh concentrations of dimethylnitrosamine induced nly hemangioendothelial tumors in BALB/c and ddN ice. Similar treatment of RF and ICR mice induced oth hemangioendothelial and hepatocellular tumors, ut in C3H mice only hepatocellular tumors resulted. somewhat similar pattern of response was found fter the administration of diethylnitrosamine. ther studies have indicated that the type of tumor s influenced to some extent by dose levels. Urehane and o-aminoazotoluene also produce a diferent response in different strains of mice. DDT, owever, produces a fairly uniform tumorigenic reponse, both in yield and type of tumor in at least our strains of mice: C57BL/6/C3H/ANF, C57BL/G/AKR, f1, and BALB/c. The natural incidence of hepatomas n both C3H and CBA mice varies from 0-4% up to 55% from year to year, suggesting a possible role for some virus in the etiology. Additional studies have indicated that male sex hormones, diet, environmental factors, and genetic influences may be involved in the induction of hepatomas. (53 references)

6603 SHORT TERM SCREENING TESTS FOR CARCINOGENS.

(Eng.) Bridges, B.A. (MRC Cell Mutation Unit, Univ. Sussex, Falmer, Brighton BN1 9QG, Sussex, England). *Nature* 261(5557): 195-200; 1976.

Several possible short-term screening tests for carcinogenic chemicals are reviewed. Many use metabolic activation or mutation induction to detect agents causing damage to DNA. Other screening methods have concentrated on malignant transformations in cultured cells. Although some of the procedures are very sensitive, the validity is often open to question. Results from tests on human cancers have strengthened the correlation between DNA damaging ability and carcinogenicity. A significant, reproducible, positive result in experimental animals may be indicative of a potential hazard for man. However, a negative result should not be taken to indicate the absence of hazard, particularly if the human population to be exposed is large and the number of animals tested is small. Short-term testing would enable potentially carcinogenic substances to be identified among the many thousands for which long-term animal testing cannot be contemplated at present and thus permit regulation to minimize human exposure. (81 references)

6604 EXOGENOUS ESTROGENS AND ENDOMETRIAL CANCER: AN INVITED REVIEW.

(Eng.) Gordan, G. S. (Univ. California Medical Center, San Francisco, CA 94143); Greenberg, B. G. *Postgrad Med* 59(6): 66-77; 1976.

News media reports that estrogens cause endometrial cancer and are contributing to cancer mortality are unjustified. Mortality from endometrial cancer has not increased in this country and may actually be starting to decline. The most likely single reason for association of estrogens with endometrial cancer is that estrogens cause uterine bleeding, which leads to histologic examination of the endometrium and to detection and therefore, an increase in incidence. The endometrial cancers in estrogen-treated women are earlier and less invasive than cancers not associated with estrogens; this supports the concept that the association probably reflects earlier detection. There are definite hazards with estrogen therapy: salt and water retention; nausea; stress incontinence; aggravation of chronic cystic mastitis, fibroids, migraine, and endometriosis; and, with very large doses, vomiting and nipple pigmentation. Cyclically administered estrogens are of established benefit for female hypogonadism, atrophic vaginitis, menopausal symptoms, postmenopausal osteoporosis, and advanced breast cancer. Estrogens should be administered only for established indications and always cyclically, with complete gynecologic examination before therapy and periodically during treatment. The dosage used should be the smallest that produces the desired effect, and treatment should continue only as long as it is needed for the purpose. (51 references)

6605 OESTROGENS AS A CAUSE OF ENDOMETRIAL CARCINOMA. (Eng.) Anonymous. (No affiliation given). *Br Med J* 1(6013): 791-792; 1976.

Postmenopausal women under hormone treatment excrete measurable amounts of estrogen, probably by the peripheral conversion of androstenedione to estrone. It has been postulated that the exclusive production of estrone rather than the normal ovarian hormone, estradiol-17β, might lead to an increased risk of endometrial cancer. In a recent study of the therapeutic history of 94 patients with endometrial carcinoma, it was found that 57% of the cancer patients had been treated with estrogens (estrone sulfate) compared with 15% of matched controls. Other studies supported this finding of increased risk of endometrial cancer in estrogen-treated women. Alternative formulations should be found for hormone replacement therapy. Suggested alternatives are estriol, which has a weak effect on the endometrium and decreases the biological effect of endogenous estrone, and estradiol-17β, which would be taken up preferentially (over estrone) by the binding protein in the endometrial cell cytoplasm. (7 references)

6606 ARE GLASS FIBERS CARCINOGENIC TO MAN? A CRITICAL APPRAISAL. (Eng.) Milne, J. (Industrial Hygiene Div., 5 Parliament Place, Melbourne 3002, Victoria, Australia). *Br J Ind Med* 33(1): 47-48; 1976.

Evidence is presented against the hypothesis that a glass fiber may be an inhaled human carcinogen because of its fibrous nature. The hypothesis was based on the observation of a high percentage of pleural tumors (mesotheliomas) in specially bred rats subjected to intrapleural application of large numbers of milled glass fibers with dimensions of about ≥20 μ in length and <3 μ in diameter. The route of application of the fibers and their site of lodgment in the animal are cited as being artificial and having no relationship to human exposure or animal inhalation. Rats and hamsters subjected to the inhalation of high concentrations (100 mg/m^3) of glass fibers with a mean diameter of 0.5 microns and a length ranging from 5-20 microns have shown no evidence of fibers in the pleural cavity. Moreover, the artificial introduction of long, thin glass fibers into the pleural cavity ensures their retention at that site for a much longer period than would occur had the fibers been inhaled or otherwise deposited in the lung parenchyma, where pulmonary clearance mechanisms operate. The fact that occupational exposures to fibrous minerals rarely induce tumors in asbestos workers suggests that the fibrous state of the mineral is unrelated to the human mesotheliomas caused by asbestos. Mesothelioma of the human pleura is instead closely connected with occupational exposure to crocidolite. (9 references)

6607 DIETARY FIBRE, A PROTECTIVE FACTOR IN THE DIET. (Dan.) Bonnevie-Nielsen, V. (Kommunehospitalet, Copenhagen, Denmark). *Ugeskr Laeger* 138(4): 199-203; 1976.

The importance of fiber in the diet is stressed for several reasons. It has a beneficial and modulating effect on colon motility that can be utilized therapeutically in the treatment of constipation and diverticulosis. The metabolism of bile salts is similarly influenced by vegetable fiber substances, and increase in dietary fiber may, under certain conditions, reduce serum cholesterol. Epidemiological data have demonstrated interaction between the bacterial flora of the intestine, bile acid metabolism, and fiber-containing substances. Increase in the dietary fiber with wheat bran influences absorption of calcium, iron and zinc. Vegetable fiber has proved to have an antitoxic effect in experimental animals. Proof of a fiber-depletion syndrome as an explanation of the acceleration of the development of certain diseases in modern times is not available as yet. Nevertheless, fiber-containing foodstuffs have important properties that may be utilized prophylactically and therapeutically. (No references)

6608 FIBRE IN THE DIET. (Eng.) Anonymous. (No affiliation given). *Med J Aust* 1(18): 644-645; 1976.

Low fiber content in the diet is associated with appendicitis, diverticulitis, colonic neoplasms, ulcerative colitis, hemorrhoids, and fissure-in-ano. Stool size is reduced and transit time is increased in low fiber patients. The treatment of choice currently for diverticular disease is increased fiber intake. One hypothesis is that breakdown products of fats may be carcinogenic, and the increased transit time seen in people with low fiber diets may give the carcinogens more time to interact with the intestinal mucosa. The other suggests an increased intake of cereal fiber as a precautionary measure. (6 references)

6609 PSYCHOSOMATIC ASPECTS OF CANCER DISEASE. (Ger.) Ringel, E. *In: Krebsbehandlung als interdisziplinaere Aufgabe.* Kaercher, K. H., ed. (New York: Springer-Verlag): pp. 46-66; 1975.

Evidence is presented that emotive conflicts have physical correlates in bodily changes, including cancer. There are certain presuppositions. First, mental effects that are pathogenic occur via the emotions. Second, the crucial junction point between the mental and physical is the autonomic nervous system, with compensatory switching between sympathetic and parasympathetic fields; their balance can be disturbed by chronic trauma or stress. Third, psychosomatic disease occurs principally in systems under autonomic regulation, including the cardiovascular, respiratory, gastrointestinal, urogenital, endocrine, and skin tissue

systems. Some of the psychic traumas correlated with
tumorigenesis include loss of an essential personal
relationship, withdrawal (regression) from unaccept-
ıble realities, inability to adapt to undesirable
constraints (as smokers who will not dishabituate
lespite the threat of bronchial carcinoma), and
intractable hopelessness. These correlates also
exacerbate the course of cancer after onset, always
ınfavorably for the patient. (48 references)

610 COLON AND RECTAL CANCER: EPIDEMIOLOGICAL CONSIDERATIONS. (Ger.) Heyden, S. (Sani-
taetsdepartement St. Gallen, St. Gallen, Switzerland);
ischer, M. *Praxis* 63(44): 1312-1315; 1974.

eographic and environmental aspects of the global
pidemiology of rectal (R) and colon (C) carcinoma
re reviewed. Retrospective studies of similar age
nd sex pairings between patient and control groups
n industrialized societies have uncovered no sig-
ificant relation of precursor gastrointestinal
isorder, evacuation schedule, laxative habituation,
lood group, weight, tobacco or alcohol consumption,
ating habits, or nutritional status with R or C
arcinoma. There is a significant correlation with
eligious practice. The vegetarian Seventh Day Adven-
ists exhibit lower rates than expected; Jewish men
nd women of Afro-Asiatic origin have a low mortality
ate and those of European-American provenance have
high mortality rate, which pattern remains in
ommunities mixed by emigration. Moreover, Jewish
en and women in American cities have significantly
igher colon, but not rectal, cancer mortality than
rotestants or Catholics. Differences in food prepara-
ion and consumption of fat- or sucrose-rich foods
re responsible. (No references)

611 MALIGNANT TUMORS OF THE LIVER AND BILIARY SYSTEM IN ADULTS. (Ger.) Grabner, G. *In:*
rebsbehandlung als Interdisziplinare Aufgabe. Kaer-
her, K. H., ed. (Berlin: Springer-Verlag): pp. 577-
97; 1975.

n extensive review of hepatomas, cholangiocellular
arcinomas arising from the bile ducts, gallbladder
arcinomas, and liver metastases is presented. The
ncidence of primary liver carcinoma is low (about
.2% of all malignant biopsies) in highly developed
reas, and high in poorly developed areas, where its
ypical onset is in the younger ages. Genetic, clima-
ic, ethnic, or socioeconomic factors appear negligi-
le in its etiology. Metabolites of azo compounds
nd aromatic amines have induced liver carcinoma in
xperimental animals, as have parent aromatic hydro-
arbons the metabolites of which are less carcinogen-
c. Naturally occurring compounds are also listed.
he interaction of carcinogen and liver cell is
iscussed in terms of enzyme induction. The precur-
or status of nodular hyperplasia is mentioned,
articularly in relation to regeneration following
artial hepatectomy. Cirrhosis and hepatoma are
onstrued as two responses to the same stimulus.
ifferences between normal and hepatoma cells are
ound in the isozyme pattern, the latter resembling the enzyme behavior of muscle or fetal liver. Accordingly, by hepatoma formation of fetal protein is cited. Metabolites of chemical carcinogens are also implicated in carcinoma of the extrahepatic bile ducts, while the precursor status of cholecystitis is noted. (30 references)

6612 PART III: WHO IS AT RISK OF COLORECTAL CANCER? (Eng.) Fraumeni, J. F.; Mulvihill, J. J. *In: Cancer Epidemiology and Prevention: Current Concepts.* Edited by D. Schottenfeld. (Springfield, IL: Charles C. Thomas): pp. 404-415; 1975.

Risk factors in development of colorectal cancer are reviewed. A high risk of adenocarcinoma of the colon and rectum accompanies the following states: familial polyposis, chronic ulcerative colitis, a history of colorectal cancer, familial occurrence, and probably a history of female breast or genital cancer. These conditions are responsible for about 6%-10% of colorectal cancer; they can be utilized for research into the origins of these neoplasms and for screening programs oriented toward early cancer detection and management. (63 references)

6613 PRELEUKEMIC STATES. (Eng.) Bernard, J. (Clinique des Maladies du Sang, Hopital Saint Louis, 2, Place du Fournier, F-75101 Paris, France). *Blood Cells* 1/2(2): 5-7; 1976.

Preleukemic states may be prototypes, forerunners, or incomplete manifestations of leukemia or unrelated diseases bearing superficial resemblances to leukemia. The diagnosis of preleukemic states is important, since it could lead to early detection of leukemic potential and effective therapy. The difficulties in determining actual preleukemic states are discussed. The study of these states could also provide information concerning the etiology and pathogenesis of leukemia. Three leukemic states are described that may be model systems for studying preleukemia and defines some pertinent questions that sould be approached. Conceivably, such studies could eventually lead to prevention and permit early and rational therapy of the leukemias themselves. (No references)

6614 ARE CHRONIC INFLAMMATORY BOWEL DISEASES PRECANCEROUS CONDITIONS? (Ger.) Fahrlander, H. (Kantonspital Basel, CH-4004 Basel, Switzerland). *Leber Magen Darm* 5(6): 272-274; 1975.

In this review ulcerative colitis and Crohn's disease are examined as precancerous states. Carcinoma appears in approximately 3%-5% of ulcerative colitis patients. It is difficult to recognized because of its diffuseness and multicentricity; recurrence is frequent without total colectomy. There is strong presumptive evidence that the frequency of neoplasms depends on the extent of ulcerative inflammation. Carcinoma is not routinely found in Crohn's disease;

the total incidence in the Anglo-American literature is 43 cases associated with granulomatous inflammation of the small intestine and 32 in Crohn's colitis. Another study of 295 patients with Crohn's disease (mean age, 14 yr) found a significant rise in small intestinal and pancreatic, but not colonic, tumors relative to the general population. A reason for the apparent rarity of cancer in terminal ileitis is the necessity of early surgical correction of fistulas, stenoses, and other sequelae of the inflammation. The relatively low cancer incidence might also follow from anatomical reasons: although ulcerative colitis is essentially a mucosal event, Crohn's inflammation is transmural, involving all levels of the intestinal wall, including regional lymph nodes. (47 references)

6615 EPSTEIN-BARR VIRUS-MALARIA INTERACTION MODELS FOR BURKITT'S LYMPHOMA: IMPLICATIONS FOR PREVENTION TRIALS.

(Eng.) Morrow, R. H. (Depts. Tropical Public Health and Epidemiology, Harvard Sch. Public Health, Boston, MA 02115); Gutensohn, N.; Smith, P. G. *Cancer Res* 36(2): 667-669; 1976.

Evidence implicating both Epstein-Barr virus (EBV) and malaria as causal factors in the pathogenesis of Burkitt's lymphoma (BL) was summarized. The worldwide distribution of BL correlates closely with that of holo- and hyperendemic malaria and, within Uganda, the incidence of BL varies directly with the intensity of malaria by district. Recently, within the Mengo districts of Uganda, the incidence of BL decreased coincident with rapid economic development and a presumed increase in the use of antimalarial drugs. Serological and nucleic acid hybridization studies suggest a causal role for EBV in the induction of BL. It is suggested that EBV vaccine could actually increase the incidence of BL, and that trials of an EBV vaccine at this time would be premature. (11 references)

6616 ONCOGENESIS IN HUMAN ACUTE LEUKEMIA.

(Eng.) Barr, R. D. (Office of Director, NCI, Bethesda, MD 20014); Perry, S. *Blood Cells* 2(1-2): 319-328; 1976.

Recent evidence in the field of leukemia research seems to incriminate viruses in the etiology of human acute leukemia; the final pathway of initiating events is probably that of genetic alteration. In acute lymphoblastic leukemia (ALL), malignant transformation may occur in a T_0 cell. Administration of corticosteroids can abolish the activity of terminal deoxynucleotidyl transferase, which is readily detectable in blast cells of most patients with ALL. In acute nonlymphoblastic leukemia (ANLL), the target for oncogenesis seems to be the hemopoietic stem cell, which shows no terminal transferase activity. Its α-DNA polymerase content is similar to that previously detected in dormant state (G_0) cells in leukemic AKR mice thymus. Unlike DNA α-polymerase, terminal transferase activity does not correlate with cell-cycle stage and thus has no part in DNA replication. Disordered and ineffective granulopoiesis noted in ANLL cell growth supports the concept of true pluripotent stem cells. Human lymphocytes have recently been found to produce clone stimulating factor (CSF), while in mice, T cell lymphocytes stimulate proliferation of true hemopoietic stem cells, as measured by the spleen colony assay. Since syngeneic T lymphocytes also stimulate proliferation of these cells in man and peripheral blood T cells have been shown to recircul to bone morrow, a physiological growth-regulating mechanism in human hemopoiesis is suspected. Eradication of the malignant clone still remains the ultimate goal in the treatment of acute leukemia. The evidence for a multi-potential stem cell and its role in preleukemia is questioned. Direct evidence seems to be needed to confirm that all three precurs progenitor cells have not been concentrated from per pheral blood. (63 references)

6617 VIRUSES AND CANCER OF THE LOWER GENITAL TRACT.

(Eng.) Josey, W. E. (Emory Univ. Clinic, 1365 Clifton Rd., N. E., Atlanta, GA 30322); Nahmias, A. J.; Naib, Z. M. *Cancer* 38(1): 526-533; 1976.

The role of viruses in cancer of the female lower genital tract is reviewed. Herpes simplex virus type 2 (HSV-2) and the genital wart virus are prime suspects in carcinomas involving the female lower genital tract. In particular, a close association has been found between HSV-2 infection and cervical neoplasia in cytohistopathologic and seroepidemiologic studies. Results of prospective studies show that women with genital herpes infection are at increased risk of developing cervical neoplasia. Additional studies are also in progress on animal models, including subhuman primates, and efforts continue in the attempt to confirm the presence of viral genetic material or its expression in human cervical cancer cells. The possibility that human wart viruses have an oncogenic potential is suggested by clinicopathologic and electron microscopic observations. (74 references)

6618 THE SLOW INFECTION CAUSED BY VISNA VIRUS.

(Eng.) Haase, A. T. (Dept. Medicine, Sch. Medicine, Univ. California San Francisco, San Francisco, CA 94143); *Curr Top Microbiol Immunol* 72: 102-156; 1976.

A view of visna virus infections is presented. The virus causes an inflammatory destructive disease of the sheep CNS, which results in demyelination and progressive neurologic disability. The prolonged incubation period and protracted clinical course make visna a prototype of slow infections. The virus is closely related to RNA tumor viruses in morphology, morphogenesis, and a number of biochemical properties. There is an association between visna virus and an RNA-directed DNA polymerase that transcribes the RNA genome of the virus into a DNA replica or provirus. The visna provirus is, at least in part, integrated into the host-cell genome. It is hypothesized that existence of the provirus provides a satisfactory resolution to one of the central issues of slow infection, persistence of virus in the face of the inflammatory and immune responses mounted by the host. Speculations about two major unresolved questions, the slowness of the disease and the nature of the tissue lesions, point to areas of significant future research. There is evidence that slowness results from the pace of provirus activation or from altered gene regulation in vivo that minimizes virus production. Direct and indirect mechanisms of cell damage may exist, both of which are related to the insertion of viral components into the membrane of the infected cell. In direct mechanisms, the membrane is damaged and the cell dies (CNS) or fuses (in vitro). The indirect mechanism proposed is that virus components elicit a cellular immune response attended by cell destruction (immunopathology). (232 references)

6619 ENDOGENOUS C-TYPE VIRUSES: DOUBLE AGENTS IN NATURAL LIFE PROCESSES. (Eng.) Levy, J. A. (Dept. Medicine, Univ. California, San Francisco, CA 94143); *Biomedicine* 24(2): 84-93; 1976.

A review of type-C RNA viruses is presented. These viruses are known in about 20 different vertebrate species. Their presence in man is suggested by electron microscopic, biochemical, and serologic studies, although a definite replicating human virus has not yet been isolated. These viruses are inherited through the germ cell, and their production is regulated by genetic information carried in the host cell. Two classes of the viruses have been recognized in mice and other species: ecotropic and xenotropic. Ecotropic viruses spread through the host and can be easily transmitted to cells of the same species; they can produce malignancy. Xenotropic viruses cannot infect cells from their host species but are infectious for cells from heterologous species. The interaction between xenotropic and ecotropic viruses could lead to the transfer among species of genetic information relating to normal life processes and malignancy. These type-C viruses may play a role in evolution, normal development, and differentiation as well as autoimmune disease and cancer. (167 references)

6620 DORMANT METASTASES WHICH MANIFEST ON IMMUNOSUPPRESSION AND THE ROLE OF MACROPHAGES IN TUMOURS. (Eng.) Alexander, P. *In: Fundamental Aspects of Metastasis*. Weiss, L., ed. (New York: American Elsevier Publishing Co., Inc.): pp. 227-239; 1976.

Research on metastases that become manifest in immunosuppression in the host and on the role of macrophages in tumors is reviewed. Syngeneic sarcomas transplanted into rats deprived of T lymphocytes show a greatly increased number of distant metastases, which manifest after surgical removal of the primary transplant, over that found in immunologically normal rats. These data support the hypothesis that specific immunity, in part mediated by a specific humoral factor, plays a role in determining whether shed tumor cells develop into a metastatic lesion. Experiments in which immunosuppressive treatments were applied a month after surgical removal of the primary tumor also led to an increase in metastases and showed that at certain sites specific immune processes contain, but do not destroy, some metastatic lesions. The spontaneous incidence of distant metastases that will kill immunologically normal rats following surgical removal of the primary tumor varies widely for different sarcomas. Infiltration of the primary transplant by macrophages appears to be a good prognostic sign, and the surgical cure rate is, in the experimental situation studied, directly related to the macrophage content of the tumor. Immune suppression lowers the macrophage content and raises the incidence of metastases. Human tumors also vary widely in their macrophage content. (23 references)

6621 IMMUNOLOGICAL ASPECTS OF HOST RESISTANCE TO THE DEVELOPMENT AND GROWTH OF CANCER (Eng.) Currie, G. (Biology Human Cancer Unit, Ludwig Inst. for Cancer Res., Chester Beatty Res. Inst., Belmont, Surrey, England). *Biochim Biophys Acta* 458(2): 135-165; 1976.

Discussion is made of the general concept of immunological surveillance and of inherited immune deficiency diseases, iatrogenic immunosuppression, the immunological status of cancer patients, and the role of immunological reactions in experimental carcinogenesis in animals. The finding that nude (immunodeficient) mice do not show a dramatic increase in spontaneous tumors or in susceptibility to chemical carcinogenesis calls into question the normal effectiveness of surveillance in suppressing tumor formation. In animals rendered immune to an experimental tumor, the detectable resistance to challenge with a living tumor is rarely effective against more than 10^5 - 10^6 cells. Particular consideration is given to the role of macrophages in surveillance, and to the inhibition of growth of tumor cells in vitro by macrophages 'activated' by a variety of stimuli. Macrophages frequently infiltrate tumors; in some tumors up to 60% of the cells within the tumor mass are host macrophages. Discussion is also made of humoral antibody as an effector in tumor immunity; the detection of antitumor-specific tumor antigen antibodies; blocking factors; the spontaneous shedding of antigens by tumor cells; and tumor-specific cytotoxic lymphocytes in cancer patients. (64 references)

6622 MOLECULAR PROBES FOR TUMOR VIRUSES IN HUMAN CANCER. (Eng.) Gallo, R. C. (Lab. Tumor Cell Biology, NCI, Bethesda, MD 20014); Reitz, M. S. *Int Rev Exp Pathol* 16: 1-58; 1976.

The application of molecular probes for tumor viruses in studies of human cancer is reviewed, with emphasis on studies with leukemic cells. Investigators have reported the presence of Epstein-Barr virus (EBV)-specific DNA in various human cell types using labeled viral DNA or complementary RNA as a molecular probe. Others have demonstrated the presence of a DNA fragment homologous to about 20% of the genome of herpes simplex 2 by DNA-DNA hybridization in a cervical carcinoma. A combination of physical characterization of the DNA product from human myelogenous leukemic cells corroborating hybridization data indicates that the endogenous reaction from myelogenous leukemic cells is probably directed by viral RNA. When the biochemical characteristics of DNA polymerases purified from RNase-sensitive endogenous DNA polymerase activities of human cells were examined, the leukemic particle DNA polymerases from the blood cells of 50% of patients with acute myelogenous leukemia (AML) and some acute lymphocytic leukemia patients had all the expected properties of viral reverse transcriptase except molecular size. Specific inhibition by antiviral DNA polymerase has shown that human AML cells contain a DNA polymerase closely related to reverse transcriptase from gibbon ape lymphosarcoma virus (GaLV) and simian sarcoma virus (SSV-1), which places it immunologically within the group of reverse transcriptases of primate oncogenic RNA viruses and permits more confidence in identifying the human reverse transcriptase as a viral marker enzyme. This appears to be the first protein of an RNA tumor virus identified in any human neoplasia. A candidate type C human virus was recently isolated three times from AML cells. The first two isolates were obtained from cultured leukocytes of a single bleed of a leukemic patient; the third isolate was from marrow obtained 14 mo later from the same patient. The two virus isolates appear to be identical, are classical type C particles, and have reverse transcriptase, p30, and p12 closely related to SSV-1 and GaLV. The biochemical properties of the virus isolate are like those observed with fresh leukemic cells from many patients with AML. (391 references)

6623 PRELEUKEMIA: DOES IT EXIST? (Eng.) Killmann, S.-A. (Dept. Medicine A, Rigshospitalet, Univ. Hosp. Copenhagen, 9 Blegdamsvej, DK-2100 Copenhagen, Denmark). *Blood Cells* 2(1/2): 81-105; 1976.

The question of the existence of preleukemia is reviewed. In acute myeloid leukemia (AML), many of the normal-appearing cells exhibit abnormalities. An interpretation is that these cells are descendants of leukemic cells that have succeeded in overcoming the major final differentiation block that exists in AML. There is direct evidence that RBC precursors in AML are of leukemic descent and it is proposed that the target cell of AML is the pluripotent stem cell. There is evidence that all three cell lines (RBC, polymorphonuclear neutrophils, and platelets) exhibit qualitative defects in preleukemia. In conclusion, preleukemic states can be considered as AML that starts with a partial and often long-lasting incomplete remission, which at a later date loses its differentiation ability and then is classified as AML. (18 references)

6624 A PERSPECTIVE FOR COLLABORATIVE STUDIES OF BREAST CANCER IN HUMAN POPULATION GROUPS. (Eng.) O'Conor, G. T. (Natl. Cancer Inst., Natl. Insts. Health, Building 10, Bethesda, MD 20014). *GANN Monogr Cancer Res* (18): 179-186; 1976.

In several recent reviews on the epidemiology of breast cancer, four factors have been identified that influence this cancer's induction and/or growth: genetic, hormonal, environmental, and viral. The evidence for genetic influence is minimal and that for the role of viruses is somewhat greater, but hormonal mechanisms are said to provide the primary stimulus and favorable milieu for induction and growth. Environmental factors are also implicated: socioeconomic status and diet (and/or nutrition) may explain the documented geographic and ethnic differences in total incidence and in age-specific incidence. Diet may operate through a hormonal mechanism in increasing the risk of breast cancer. On the basis of this evidence, a pathogenetic scheme is devised that recognizes a genetic susceptibility, along with environmental factors, acting through a hormonal mechanism to produce the biochemical aberration favorable to induction. (51 references)

6625 PATHOGENESIS AND STAGING OF SCLERODERMA. (Eng.) Winkelmann, R. K. (Dept. Dermatology, Mayo Clinic, Rochester, MN 55901). *Acta Derm Venereol (Stockh)* 56(2): 83-92; 1976.

The pathogenesis and staging of scleroderma are reviewed. If the scleroderma syndromes related to occupational, immunologic, inflammatory, metabolic, and genetic factors are recognized, true progressive systemic scleroderma (PSS) is a disease of vascular fibrosis with secondary inflammatory phases. The primary pathology appears to be a fibromucinous change of the vascular endothelium. The vessels also demonstrate altered reactivity to cold and to serotonin. Biopsy of the skin of the inflammatory or mesenchymal scleroderma sometimes shows (by positive direct immunofluorescence) deposition of globulins at the basement membrane zone. A system of clinical staging of PSS is proposed that relates the organ involvement to the prognosis. (88 references)

6626 BLOOD GROUPS CHANGES IN PRELEUKEMIC STATES. (Eng.) Salmon, C. (Centre National de Transfusion Sanguine, Etablissement Saint Antoine, 53 boulevard Diderot, F-75571 Paris Cedex 12, France). *Blood Cells* 2(1/2): 211-220; 1976.

Blood group changes in preleukemic states and blood group abnormalities in hematogical diseases and in normal individuals are reviewed. Modifications of blood groups in the course of malignant hemopathies are related to the disease itself and appear to be essentially clonal. They refer not only to the glycolipidic ABH and associated antigens, but also to other blood group systems or other genetic markers. These multiple abnormalities are observed in the preleukemic states as well as in the actual leukemias.

Similar abnormalities, but limited to one genetic unit, can occur in apparently normal subjects, especially the aged. The various modifications observed are related to the genetic function, as shown by their clonal character. The evidence of abnormalities affecting two linked genetic systems like ABO and AK supports this hypothesis. Furthermore, the distribution of immunoglobulin marker abnormalities corresponds to that of one of the haplotypes of the Gm genotype. Finally, the glycosyltransferase itself is abnormal too, in the case of ABH antigen abnormalities. In all the cases investigated to date, the apparently new characters were in fact unconverted substrates, comparable to the carcinoembryonic antigens. (11 references)

6627 PROBLEMS RELATING TO IMMUNOSELECTION OF LEUKEMIAS. (Eng.) Pedrinis, E. (Inst. Pathology, Univ. Bern, CH-3000 Bern, Switzerland); Zinmermann, A.; Bertschmann, M.; Hess, M. W.; Cottier, H. *Blood Cells* 2(1/2): 329-343; 1976.

Problems in the immunoselection of neoplastic, in particular leukemic, cell lines are reviewed. Since the evidence shows that specific immune reactions of the host against malignant neoplastic cells do occur, it is important to consider the effectiveness and the relevance of immunity in suppression or elimination of neoplastic growth. Emphasis is placed on experimental results obtained in syngeneic tumor-host combinations, because they more closely resemble the situation of spontaneous tumorigenesis or leukemogenesis than xenogeneic or allogeneic model systems. Studies of neoplasia in human immunodeficiency syndromes offer an important insight into immunoselection of leukemic cell lines: the marked predominance of leukemias and lymphoreticular neoplasias in immunodeficient patients invites speculation on both the mechanisms of leukemogenesis and the relative importance of the immune system in eliminating malignant neoplastic cells. (37 references)

6628 THE PRELEUKEMIC SYNDROME: CLINICAL AND LABORATORY FEATURES, NATURAL COURSE, AND MANAGEMENT. (Eng.) Linman, J. W. (Div. Hematology and Medical Oncology, Univ. Oregon Health Sciences Center, 3181 S. W. Sam Jackson Park Road, Portland, OR 97201); Bagby, G. C. *Blood Cells* 2(1/2): 11-31; 1976.

The clinical and laboratory features of the early stages in the evolution of acute nonlymphocytic leukemia are reviewed. Observations to date leave little doubt as to the existence of a recognizable hematologic syndrome preceding the development of acute nonlymphocytic leukemia. However, the syndrome, usually designated the preleukemic syndrome, is not a separable entity or a specific disease but a stage in a multiphasic myeloproliferative disorder. This panmyelopathy involves all products of the marrow stem cell and is, therefore, a marrow stem cell disorder. The disease ordinarily begins as a RBC disease (refractory or sideroblastic anemia) and progresses to involve megakaryocytes and platelets and, finally, granulocytes and/or monocytes; the terminal event is an acute myelomonoblastic (or nonlymphocytic) leukemia. Variations in the duration of this disorder and differences in clinical and laboratory features most likely reflect differences in host responses rather than in pathogenic mechanisms. It seems likely that there may exist only one type of acute nonlymphocytic leukemia, the early phases of which consititute the preleukemic syndrome. Types of disease usually viewed as specific entities (e.g., sideroblastic anemia, refractory anemia, erythroleukemia, acute granulocytic leukemia, and acute or chronic monocytic leukemia) may be stages in a single disease. Although the natural course of this marrow disorder is not yet clearly defined, the clinical and hematologic features of its evolutionary stages are fairly uniform among patients and thus permit prospective studies. (32 references)

6629 HUMAN CHROMATIN AND CHROMOSOMES STUDIED BY SCANNING ELECTRON MICROSCOPY: PROGRESS AND PERSPECTIVES. (Eng.) Golomb, H. M. (Dept. Medicine, Univ. Chicago, Univ. Chicago Cancer Res. Center, Chicago, IL 60637). *J Reprod Med* 17(1): 29-35; 1976.

The use of scanning electron microscopy (SEM) to study the topography of air-dried and critical-point-dried human chromatin and chromosomes is reviewed. The application of SEM to whole-mount preparations of human chromosomes can easily demonstrate cell cycle-dependent changes. Chromomeres provide a basis for the banding patterns produced by various stains in light microscopy. In a highly condensed metaphase chromosome, only a a rare free fiber end is seen, suggesting that a single chromatin fiber folds into a chromatid. The presence of interchromosomal fibers suggests that the DNA molecule (i.e., the chromatin fiber) might be folded into more than one chromosome. The specificity of the 9q+/22q-(Ph^1) translocation in chronic myelogenous leukemia and the evidence for nonrandom translocation abnormalities in adult acute leukemia suggest that either the linear integrity of the chromatin fiber comprising several chromosomes is real or that the nuclear membrane attachment site of individual chromosomes results in specific, adjacent chromosomes available for the induction of nonrandom translocations. (38 references)

6630 SURFACE MARKERS AND OTHER CHARACTERISTICS OF THE LYMPHOCYTE IN CHRONIC LYMPHOCYTIC LEUKEMIA. (Eng.) Bentwich, Z. (Dept. Medicine C, Kaplan Hosp., Rehovot, Israel); Polliack, A.; Douglas, S. D. *Israel J Med Sci* 12(4/5): 304-324; 1976.

Research on human B and T cells in chronic lymphocytic leukemia (CLL) is reviewed. Most leukemic cells bear surface Ig. The class restriction of this surface Ig and other characteristics described for CLL are considered evidence for the monoclonality of the neoplastic proliferation. Different CLL cases with various expressions of surface Ig represent various degrees of blocking in the maturation of lymphocytes. Other cell markers have shown that most cases of CLL represent B cell neoplasia. Variations in the expression of the various B cell markers on the leukemic cells occurred. One case in which the leukemic cells were clearly T cell in character and a single case of mixed B and T CLL are described. Studies with sheep RBC rosette formation indicate that there are two distinct B cell populations in normal peripheral WBC, one of which also carries a receptor for sheep RBC. Scanning electron microscopy (SEM) can be a useful adjunct to the identification of B- and T-derived lymphocytes. According to the above criteria, leukemic cells are mostly of the B type, although there are variations in their surface architecture. It is concluded that SEM alone cannot consistently distinguish between leukemic B and T cells. Electron microscope studies of mitogen-transformed CLL lymphocytes suggest that there is a residual normal B and T population of cells in addition to the predominant, abnormally reacting cells, which are mostly of B origin. Antigenic changes on the surface of CLL lymphocytes are suggestive of normal antigens present on young normal lymphocytes, rather than of the emergence of truly tumor-specific antigens. These antigens are independent of the T or B origin of the leukemia. CLL lymphocytes are shown to be defective in their ability to form caps with concanavalin A and anti-HL-A sera and in their osmotic regulatory capacity. (43 references)

6631 TRANSLATIONAL REGULATORY MECHANISMS IN NEOPLASIA IN VIVO. (Eng.) Pitot, H. C. (McArdle Lab. for Cancer Res., Univ. Wisconsin, Madison, WI). *Adv Pathobiol* 2: 29-33; 1976.

Various mechanisms for regulating genetic expression and alterations in these mechanisms that may lead to malignancy are reviewed. The tryptophan oxygenase synthesis response to tryptophan and cortisone, separately and in combination, seen in the livers of normal, adrenalectomized animals, is altered or absent in hepatomas. Early (first 2 hr) in the induction of serine dehydratase (SDH), the induction is sensitive to actinomycin D treatment (requires messenger RNA (mRNA) synthesis, but after this induction is resistant to actinomycin D treatment for another 6-8 hr (modulation at the translational level). The period of actinomycin D resistance is the period of mRNA template stability for that particular protein product. Glucose suppresses the synthesis of gluconeogenic enzymes such as SDH and appears to enhance the degradation of this enzyme. These effects are at the translational level. The enzymes in normal liver can be varied by the environment. Among liver cell tumors, however, each of a number of enzymes is at a different level and cannot be modulated by the environment, resulting in the expression of a unique phenotype for each tumor. Radioimmunoassay methods indicate that fully induced SDH is synthesized mainly on bound polysomes of the rough endoplasmic reticulum, while at earlier times it may be located on free polysomes. Among hepatomas, the capacity of cell membranes, including the rough endoplasmic reticulum, to bind polysomes is reduced. A hypothesis of the epigenetic mechanism of carcinogenesis by certain chemicals proposes that the carcinogen unstabilizes the mRNA template by affecting its association with the membrane of the rough endoplasmic reticulum. At some point during carcinogenesis, the template instability becomes fixed and no longer requires the presence of the carcinogen. At this point the membrane, acting as its own template, passes the abnormality on to daughter cells without the requirements of genetic intervention. (9 references)

6632 CERTAIN GENERAL BIOLOGICAL ASPECTS OF CARCINOGENESIS. PART III. CHANGES IN THE ENERGY BALANCE. (Rus.) Artamonov, V. I. (Marx Smolens State Inst. Pedadogy, Smolensk, USSR). *Usp Sovrem Biol* 81(1): 141-156; 1976.

The formation of pathological neoplasms in plants involves comprehensive changes in the energy balance. Experiments using specific inhibitors of respiration and analysis of end products of respiration have indicated that the basis of alcohol fermentation in plant neoplasms lies in the inhibition of mitochondrial oxidation. That process in tumor cells may, in turn, be connected with a decrease in the amount of mitochondria, a change in their structure, a reduction in the activity of some Krebs cycle enzymes, o reduced activity of the electron transport chain. Although alcohol fermentation increases during tumor growth, there is a sharp increase in cancerous plant cells of phosphor compounds, particularly energy rich compounds of the ATP-ADP system. Changes in the energy balance during plant tumor growth are basically similar to those occurring in transplanted animal tumors. Contrary to Warburg's theory that changes in the energy balance of the living cell constitute the sole cause of cancer, extremely important changes probably take place at various levels (the external cytoplasmic membrane, the cytoplasm with cell organelles, the nucleus) during tumor formation. (122 references)

6633 EFFECTS OF 5-BROMODEOXYURIDINE ON TUMORIGENICITY, IMMUNOGENICITY, VIRUS PRODUCTION, PLASMINOGEN ACTIVATOR, AND MELANOGENESIS OF MOUSE MELANOMA CELLS. (Eng.) Silagi, S. (Lab. Cell Genetics, Dept. Obstetrics and Gynecology, Cornell Univ. Medical Coll., New York, NY). *Int Rev Cytol* 45: 65-111; 1976.

The effects of 5-bromodeoxyuridine (BUdR) on some functions in a highly pigmented clone ($B_5$59) of a mouse melanoma cell line are reviewed. Investigations on the suppression of tumorigenicity by BUdR revealed separate components involved in the tumorigenic potential of melanoma cells. Both reduction in the intrinsic ability of the cells to grow in vivo and changes evoking host defense mechanisms appear to operate in the reduction of tumorigenicity by BUdR treatment. Host response may depend on antigenic changes, some of which may be related to the induction of type C virus in BUdR-treated cells. These changes must involve alterations in the cell membranes, which could produce antigenic differences eliciting host response or which could reduce the cells' capacity to form tumors in vivo. BUdR melanogenesis is suppressed through a coordinated effect on the structural and enzymic proteins required for melanin synthesis. These results are consistent with the cessation of synthesis of tyrosinase and melanosomal structural proteins in BUdR-treated cells and indicate that there may be a program of gene activity for melanogenesis that is regulated as a unit. Melanoma cells grown in BUdR also produce previously undetectable type C virus, become immunogenic, and exhibit changes in specific antigens. There is also a decrease in a serine protease and plasminogen activator (PA), which is an analog of thymidine. A critical question in the melanoma cell system is whether there is a relationship between the control mechanisms governing the effects on all the parameters discussed i.e., melanogenesis, tumorigenicity, immunogenicity, viral induction, and expression of PA. (71 references)

6634 ROLE OF DNA REPAIR IN CELL INACTIVATION, AGING, AND TRANSFORMATION: A SELECTIVE REVIEW, A SPECULATIVE MODEL. (Eng.) Williams, J. R. (Lab. Radiobiology, Dept. Physiology, Harvard Univ., Sch. Public Health, Boston, MA). *Adv Radiat Biol* 6: 161-210; 1976.

An extensive review is presented of the following aspects of DNA repair: DNA repair in prokaryotes; characteristics of mammalian DNA; repair activities observed in mammalian cells; the cell-mediated disassembly of DNA and the association of cell death with disassembly; inactivation of cellular proliferative capacity by radiation; accelerated aging produced by ionizing radiation; and cell transformation and latent virus induction in vitro following exposure to radiation. A model is proposed for the correlation of DNA repair activities and cellular effects in irradiated mammalian cells. It operates under the following assumptions: (1) that intrinsic repair processes, which alter DNA structure and function, determine, to a large extent, the nature of cellular effects observed in irradiated cells; (2) that such intrinsic processes fall under the metabolic control of the cell; (3) that the nature of molecular repair after radiation discriminates against heavily damaged cells and acts as an agent of cell selection; (4) that at least two major repair sequences, characterised by DNA structural changes, are distinguishable after irradiation (one observed typically after ionizing radiation, the other after UV radiation); (5) that both these molecular sequences are limited by metabolic conditions in dividing cell populations, either in time available for repair or in the specific phases of the cell cycle during which repair can occur; (6) that nongrowing cells can perform DNA repair after both ionizing radiation and UV irradiation over extended periods of time; (7) that radiation, as well as other toxic agents, kills cells by inducing a sudden, cell-mediated reduction in DNA molecular wt (DNA disassembly); and (8) that radiation induces transformation and cancer by causing changes in the DNA that are similar to changes induced by the aging process. Such changes initiate DNA repair, a concomitant of which is disassembly of cellular DNA to viral-sized pieces. This repair facilitates the expression of a DNA sequence that transforms the cell. (97 references)

6635 RELATION OF VASCULAR PROLIFERATION TO TUMOR GROWTH. (Eng.) Folkman, J. (Dept. Surgery, Children's Hosp. Medical Center, Boston, MA); Cotran, R. *Int Rev Exp Pathol* 16: 207-248; 1976.

A comprehensive review is presented of normal endothelial turnover and proliferation and of tumor neovascularization (angiogenesis). Neovascularization separates the development of any solid tumor into two stages: (1) the avascular stage, in which the maximum size of the cell population is limited to about one million (equivalent to a spheroid of 1-2 mm in diameter); (2) the vascular stage, in which rapid further growth is permitted. The capacity of neoplastic liver to stimulate capillary proliferation appears to be mediated by a diffusable material, called tumor angiogenesis factor (TAF), secreted from the tumor cells. The purification and bioassay of TAF are discussed. The ability of tumor cells to induce angiogenesis is not related to the initiation of classical inflammatory or immune responses. The following experimental approaches to the study of tumor angiogenesis are described: tumor growth in isolated perfused organs; tumor angiogenesis in the dorsal air sac of the rat, in the rabbit eye, on the chorioallantoic membrane; the vascularization of normal and neoplastic transplanted tissues; the effect of irradiation on the capacity of tumors to induce angiogenesis; the growth of avascular tumors in soft agar suspensions; the inhibition of tumor angiogenesis by a diffusable factor from cartilage. The following tumors have been shown to consistently induce neovascularization: mouse mammary carcinoma, mouse plasmacytoma (MOPC and TEPC), mouse melanoma, mouse teratoma, SV3T3, Walker 256 sarcoma, Brown-Pearce tumor, and V2 carcinoma. Embryonic grafts, unlike tumor transplants, become vascularized by anastomosis of host and graft vessels, not by induction of neovascularization in the host. (82 references)

6636 ADVERSE REACTIONS TO RADIOPHARMACEUTICALS. (Eng.) Shani, J. (Radiopharmacy Lab., Sch. Pharmacy, Hebrew Univ., Jerusalem, Israel); Atkins, H. L.; Wolf, W. *Semin Nucl Med* 6(3):305-328; 1976.

An extensive review is presented of side effects and adverse reactions resulting from the use of radiopharmaceuticals. The period of study covers the past 25 yr, and the following target-organ systems are considered: lung, CNS, liver, bone marrow, thyroid, kidney, skin, peritoneum, pituitary gland, blood, and lymph. A brief discussion is made of the purposes and nature of the Registry on Adverse Reactions to Radiopharmaceuticals established in 1971 by the Society of Nuclear Medicine following an initial survey carried out for the years 1967-1969. (142 references)

6637 PRINCIPLES AND TECHNIQUES FOR THE STUDY OF PLASMA MEMBRANE RECEPTORS RELATED TO HORMONE ACTION. (Eng.) Hollenberg, M. D. (No affiliation given); Cuatrecasas, P. *Methods Cancer Res* 7: 317-366; 1976.

The methods employed for the study of insulin-receptor interactions are reviewed. Studies on insulin binding in fat and liver cells reflect a true hormone-receptor interaction; there is a clear correlation between the biological (dose-response, serum level) and physicochemical data. In contrast, studies of the interaction of insulin with fibroblasts and lymphocytes reveal significant quantitative discrepancies between the K_D in the cultured cells and both the K_D observed in liver and fat cells and the known serum levels of insulin. Methods in addition to measurements of ligand binding afford a more complete picture of the insulin receptor. The use of enzymatic probes complements studies of insulin binding, so as to provide information not only about the chemical structure of the insulin receptor itself, but also about the nature of those constituents involved in the translation of the binding signal into a cellular response. The solubilization and physicochemical characterization of the insulin receptor have yielded information on the size of the insulin-binding species. Macromolecular insulin derivatives prove useful in localizing the insulin receptor at the cell membrane and in the isolation of receptors. Additionally, the macromolecular insulin derivatives possess interesting pharmacologic properties that warrant further study. (139 references)

6638 A FUNCTIONAL CLASSIFICATION OF MALIGNANT LYMPHOMAS. (Eng.) Lukes, R. J.; Collins, R. D. *In: The Reticuloendothelial System.* Rebuck, J. W.; Berard, C. W.; Abell, M. R., eds. (Baltimore: The Williams and Wilkins Co.): pp. 213-242; 1975.

A functional approach to the classification of malignant lymphomas is proposed; it is based on the recently defined lymphocytic systems and on lymphocyte transformation developing as a block or a derepression in transformation. The preliminary results of various retrospective studies indicate that the majority of non-Hodgkin's lymphomas present the features of B cells as follicular center cells (FCC) of either the cleaved or noncleaved cell types. Nodularity of lymphomas was observed only with these FCC types. Lymphomas of large transformed lymphocytes designated as immunoblastic sarcoma of B cells, occurring either in monomorphous form or with plasmacytoid features, developed in individuals with chronic abnormal immune states and in patients on immunosuppression therapy for graft rejection. The lymphomas reported in patients with Sjogren's syndrome, alpha chain disease, and immunodeficiency disorders are probably also immunoblastic sarcomas. Most lymphomas previously interpreted as histiocytic lymphoma or reticulum cell sarcoma seem to represent lymphomas of transformed lymphocytes, either as noncleaved FCC or immunoblastic sarcomas; lymphomas of true histiocytes are rare. T-cell lymphomas seem to include Sezary's syndrome, mycosis fungoides, probably Hodgkin's disease, and the convoluted lymphocytic type previously included within acute lymphocytic leukemia of childhood. Another, possibly morphologically distinctive, type of T-cell lymphoma occurs in older individuals, but its clinical significance is undefined. The proposed new functional classification includes the following major types: U cell, for those cells without specific markers; T cell; B cell; histiocytic; and unclassifiable, for tissue technically insufficient for specific classification. Studies using the modern pathologic investigative approach provide strong support for the new functional approach. (45 references)

6639 ETIOLOGIC AND FUNCTIONAL ASPECTS OF THYROID CANCER. (Eng.) Volpe, R. (Dept. Medicine, Univ. Toronto, Toronto, Canada). *Can Med Assoc J* 113(2): 87-88; 1975.

Factors associated with thyroid cancers, plus various methods of treatment, were summarized. It was suggested that there is no clear evidence for a genetic predisposition to thyroid cancer, except in the case of medullary cancer. One environmental factor that seems to have contributed significantly to the incidence of this disease is ionizing radiation (radiotherapy or exposure to fallout). The amount of radiation required to cause an increased incidence of thyroid tumors is estimated to lie between 50 and 500 rads. Functions in thyroid cancer cells vary, yet often some dependency on thyroid-stimulating hormone (TSH) persists; therefore thyroxine was recommended to suppress TSH secretion. Usually these tumors produce less thyroid hormone than the normal gland, though cases of hyperthyroidism have been reported. Only tumors that can pick up appreciable amounts of ^{131}I will regress after ^{131}I treatment. Medullary cancer differs from other thyroid cancers in that it is not made up of follicular cells, but appears to arise from the parafollicular cells and produces large amounts of calcitonin and prostaglandin, and occasionally ACTH and serotonin. It will not respond to TSH nor can it concentrate ^{131}I; therefore different methods of diagnosis and treatment are needed. Calcitonin immunoassays were recommended for individuals with a family history of this disease. (28 references)

6640 CELL DETERMINATION AND DIFFERENTIATION. (Rus.) Olenov, Iu. M. (Inst. Cytology, Acad. Sciences USSR, Leningrad, USSR). *Tsitologiia* 17(10): 1119-1123; 1975.

The mechanism of inheritance of histogenetic potentials and the properties of differentiated cells are reviewed. The most likely interpretation connects the inheritance of a determinative state with e replication of nonchromosomal nucleic acids at fulfill a regulatory role; one variant of the pothesis ascribes these functions to RNA. The operties of definitive cells (the results of fferentiation) are inherited in a much less stable rm than is the determined state, which emphazes the necessity to distinguish between the two enomena. The results of several studies confirm e theory of cyclic relationship in genome acvity. Few structural genes (1%) are active in e zygote, which is presumed to lack exosomes, e., nonchromosomal DNA that influences gene lolization. This accords with the hypothesis that e regulation of transcription in higher animals due mainly to the action of activators. In the sence of exosomes, cyclic relationships that dermine tissue-specific criteria arise between the rious gene groups. With the subsequent appearce of exosomes, these cyclic relationships are adjusted. (25 references)

41 CELL-MEDIATED MUTAGENICITY OF DIFFERENT GENETIC LOCI IN MAMMALIAN CELLS BY CARCINONIC POLYCYCLIC HYDROCARBONS. (Eng.) Huberman, E. : *Screening Tests in Chemical Carcinogenesis. oceedings of a workshop organized by IARC and the mmission of the European Communities and held in ussels, Belgium, 9-12 June 1975.* Montesano, R.; rtsch, H.; Tomatis, L., eds. International Agency r Research on Cancer. (Lyon, France): IARC Scienfic Publications No. 12, pp. 521-535; 1976. (35 ferences)

42 ALCOHOL AND CANCER (Letter to Editor). (Eng.) Zanoboni, A. (Istituto di Clinica dica IV, Universita di Milano, 20122 Milan, Italy); noboni-Muciaccia, W. *Lancet* 1(7974): 1408; 1976. references)

43 GENETIC TOPICS IN RADIATION PROTECTION (Ger.) Traut, H. (Institut fuer Strahlenclogie, Westfaelische Wilhelms-Universitaet, Muenster, st Germany). *Atomkernenergie* 28(1): 23-27; 1976. 5 references)

44 DISTRIBUTION OF RADIOACTIVE MATERIALS IN AQUATIC ENVIRONMENTS, WITH CONSIDERATION THEIR CARCINOGEIC POTENTIAL IN AQUATIC ANIMALS. ng.) Volchok, H. L. (Environmental Studies Div., alth Safety Lab., US Atomic Energy Commission, New rk NY 10014). *Prog Exp Tumor Res* 20: 35-43; 1976. references)

45 THE SEARCH FOR VIRUSES IN HUMAN CANCER. (Eng.) Spiegelman, S. (Inst. Cancer Res., ll. Physicians and Surgeons, Columbia Univ., New rk, NY). *Proc Am Philos Soc* 120(2): 69-86; 1976. references)

6646 FACTORS CONTROLLING THE GROWTH OF 3T3 CELLS AND TRANSFORMED 3T3 CELLS. (Eng.) Holley, R. W. (Salk Inst. for Biological Studies, San Diego, CA 92112). *Cold Spring Harbor Conf Cell Proliferation* 2: 777-784; 1975. (26 references)

6647 FIBROBLAST SURFACE ANTIGEN MOLECULES AND THEIR LOSS FROM VIRUS-TRANSFORMED CELLS: A MAJOR ALTERATION IN CELL SURFACE. (Eng.) Vaheri, A. (Dept. Virology, Univ. Helsinki, Haartmaninkatu 3, SF-00290 Helsinki, Finland); Ruoslahti, E. *Cold Spring Harbor Conf Cell Proliferation* 2: 967-975; 1975. (38 references)

6648 REVIEW OF IMMUNOLOGICAL CONDITIONS IN PATIENTS WITH MALIGNANT MELANOMA OF THE SKIN. (Dan.) Kristensen, E. (Fibiger Laboratoriet, Ndr. Frihavnsgade 70, DK-2100 Copenhagen 0, Denmark). *Ugeskr Laeger* 138(8): 463-468; 1976. (No references)

6649 BREAKDOWN OF NON-IMMUNE METASTASIS RESISTANCE AFTER CYTOSTATIC DRUGS. (Eng.) de Ruiter, J. (Radiobiological Inst. TNO, Lange Kleiweg 151, Rijswijk, The Netherlands); Smink, T.; Jansen, J.; van Putten, L. M. *In: Chemotherapy, Proceedings of the Ninth International Congress of Chemotherapy, held in London, July 1975.* Hellmann, K.; Connors, T. A., eds. (New York: Plenum Press): vol. 8, Cancer Chemotherapy II, pp. 9-10, 1976. (3 references)

6650 ARE CHROMOSOMAL CHANGES RELATED TO ETIOLOGICAL AGENTS? (Eng.) Rowley, J. D. *In: Proceedings of the Eleventh Canadian Cancer Research Conference. Meeting Held in Toronto, 6-8 May 1976.* Natl. Cancer Inst. Canada. (Toronto, Ontario): pp. 124-133; 1976. (37 references)

6651 THE GRANULOMATOUS INFLAMMATORY RESPONSE: A REVIEW. (Eng.) Adams, D. O. (Dept. Pathology, Duke Univ. Medical Center, Durham, NC 27710). *Am J Pathol* 84(1): 164-191; 1976. (172 references)

6652 ANERGY AND INFECTION. (Eng.) Bullock, W. E. *In: Advances in Internal Medicine.* Stollerman, G. H.; Harrington, W. J.; Kirsner, J. B.; Kossman, C. E.; Siperstein, M. D., eds. (Chicago: Year Book Medical Publishers, Inc.): vol. 21, pp. 149-173; 1976. (107 references)

6653 GENERAL METABOLIC CHARACTERISTICS IN CANCER. (Eng.) Bodansky, O. *In: Biochemistry of Human Cancer.* (New York: Academic Press): pp. 1-32; 1975. (81 references)

6654 TREATMENT OF LARGE VILLOUS TUMORS OF THE LOWER RECTUM BY MULTIPLE-STAGE FULGURATION. (Eng.) Hanley, P. H. (Ochsner Clinic, 1514 Jefferson Highway, New Orleans, LA 70121). *Tex Med* 72(1): 98-101; 1976. (9 references)

6655 BIOCHEMISTRY OF THE CELL CYCLE. (Eng.) Hill, B. T. *In: Scientific Foundations of Oncology*. Symington, T.; Carter, R. L., eds. (London: William Heinemann Medical Books Ltd.): pp. 63-72; 1976. (80 references)

6656 THE CONTRIBUTION OF EPIDEMIOLOGY TO KNOWLEDGE OF CANCER. (Eng.) Doll, R. (Dept. Regius Professor Medicine, Radcliffe Infirmary, Oxford, Great Britain). *Rev Epidemiol Med Soc Sante Publique* 24(2): 107-121; 1976. (11 references)

6657 ULTRASTRUCTURE OF TUMOUR CELLS. (Eng.) Birbeck, M. S. *In: Scientific Foundations of Oncology*. Symington, T.; Carter, R. L., eds. (London: William Heinemann Medical Books Ltd.): pp. 8-15; 1976. (27 references)

6658 MECHANISMS OF TUMOUR INVASION. (Eng.) Easty, G. C.; Easty, D. M. *In: Scientific Foundations of Oncology*. Symington, T.; Carter, R. L., eds. (London: William Heinemann Medical Books Ltd.): pp. 167-172; 1976. (38 references)

6659 AGEING IN TUMOURS. (Eng.) Bird, C. C.; Willie, A. H.; Currie, A. R. *In: Scienific Foundations of Oncology*. Symington, T.; Carter, R. L., eds. (London: William Heinemann Medical Books Ltd.): pp. 52-61; 1976. (59 references)

6660 STROMA IN TUMOURS. (Eng.) McGee, J. O'D.; Al-Adnani, M. S. *In: Scientific Foundations of Oncology*. Symington, T.; Carter, R. L., eds. (London: William Heinemann Medical Books Ltd.): pp. 45-52; 1976. (46 references)

6661 GEOGRAPHICAL PATHOLOGY IN ENVIRONMENTAL CARCINOGENESIS. (Eng.) Higginson, J. *In: Proceedings of the Eleventh Canadian Cancer Research Conference. Meeting Held in Toronto, 6-8 May 1976.* Natl. Cancer Inst. Canada. (Toronto, Ontario): pp. 48-57; 1976.(11 references)

6662 CANCER IN HUMANS: EXPOSURES AND RESPONSES IN A REAL WORLD. (Eng.) Kolbye, A. C. (Associate Director Sciences, Bureau Foods, US Food and Drug Admin., HFF-100, FB-8, Room 2025, 200 C St., SW, Washington, DC 20204). *Oncology* 33(2): 90-100; 1976. (61 references)

6663 THE CONTRIBUTION OF CELL FUSION STUDIES TO THE ANALYSIS OF NEOPLASIA. (Eng.) Sidebottom, E. *In: Scientific Foundations of Oncology*. Symington, T.; Carter, R. L., eds. (London: William Heinemann Medical Books Ltd.): pp. 36-44; 1976. (28 references)

6664 CELL POPULATION KINETICS IN NORMAL AND MALIGNANT TISSUES. (Eng.) Lamerton, L. F. *In: Scientific Foundations of Oncology*. Symington, T.; Carter, R. L., eds. (London: William Heinemann Medical Books Ltd.): pp. 119-125; 1976. (25 references)

6665 SIGNIFICANCE OF BACTERIAL STEROID DEGRADATION FOR THE ETIOLOGY OF LARGE BOWEL CANCER. IV. DECONJUGATION OF GLYCOCHOLIC ACID, OXIDATION, AND REDUCTION OF CHOLIC ACID BY SACCHAROLYTIC BACTERIODES SPECIES. (Ger.) Edenharder, R. (Hygiene-Institut der Universitaet Mainz, Hochhaus am Augustusplatz, D-6500 Mainz, West Germany); Slemrova, J. *Zentralbl Bakteriol (Orig B)* 162(3/4): 350-373; 1976.

Based on the suspicion that anerobic bacteroid strains (whose mature forms can constitute 20%-80% of the intestinal flora) are capable of degrading conjugated bile acids (with the formation of products that are carcinogenic or cocarcinogenic for the colon), chromatographic and mass spectrophotometric assays were made of glycocholate splitting and cholate breakdown in growing cultures and cholate degradation in resting cells under aerobic conditions. A total of 38 strains of *Bacteroides vulgatus*, *fragilis*, *thetaiotaomicron*, and *distasonis* was used. Glychocholate deconjugation via acid amide splitting was established in 23 strains; complete hydrolysis was accomplished by 18 strains. Almost all strains (32/36) degraded cholate under anaerobic conditions, usually forming one, but occasionally two or three, metabolites. Moreover, 30/37 strains generated at least one, and occasionally more than two, metabolites under aerobiosis. Only three strains metabolized cholate during the growth phase. The chief metabolite of both aerobic and anaerobic breakdown was 3α, 12α-dihydroxy-7-oxo-5β-cholanoate. The main product of cholate breakdown in vivo, 3α,12α-dihydroxy-β-cholanoate (deoxycholate), was formed by only three strains. A deoxycholate derivative, a monohydroxymonooxocholanoate, was another anaerobic metabolite. None of the species could metabolize the cholate side chain either aerobically or anaerobically. Degradation of the steroid structure was not found. (68 references)

6666 THE FATE OF AFLATOXINS IN THE PREPARATION OF PROTEIN CONCENTRATES AND ISOLATES FROM CONTAMINATED PEANUT AND COTTONSEED FLOURS. (Eng.) Stoloff, L. (Bureau Foods, Food & Drug Admin., Washington, DC 20204); Trucksess, M.; Martinez, W. *J Food Sci* 41(5): 1251-1253; 1976.

Simulated commercial protein concentrate and isolate processes were applied to aflatoxin-contaminated peanut and cottonseed flours to determine the fate of the aflatoxins. Processes for producing concentrate by washing the flour at the protein isoelectric point (pH 4.5) were ineffective in separating the aflatoxin from the products, but a process using an aqueous alcohol wash accomplished a 90% reduction in the aflatoxin level of the concentrate compared to the flour. The processes for producing isolate by protein dissolution in alkali and its recovery by precipitation at the isoelectric point resulted in some aflatoxin loss, but there was an increase in the aflatoxin concentration associated with the protein isolate compared to the original flour. However, a process applying carbon adsorbent to the alkaline solution reduced the aflatoxin level of the isolate by 90%. The results show that the basic process used by industry to prepare protein isolates from soybeans will concentrate most of any aflatoxin present in feed stock in the isolate. (10 references)

6667 HUMAN DIPLOID FIBROBLAST MUTANTS WITH ALTERED RNA POLYMERASE II. (Eng.) Buchwald, M. (Res. Inst., Hosp. for Sick Children, Toronto, Ontario, M5G 1X8 Canada); Ingles, C. J. *Somatic Cell Genet* 2(3): 225-233; 1976.

Clones resistant to the cytotoxic action of α-amanitin were isolated from a strain of fetal human lung diploid fibroblasts. Resistant clones were recovered at a frequency of 5×10^{-8} after single-step selections following mutagenesis with ethyl methane sulfonate. Following propagation in drug-free medium, the clones retained the selected phenotype and in both growth and plating experiments showed a 10-50 times higher resistance than wild-type cells to the cytotoxicity of 0.25 μg/ml α-amanitin. The α-amanitin sensitivity of RNA polymerase II purified from the mutant cells suggests the presence of two forms of the enzyme, one similar to that in wild-type cells and a second form with increased resistance to α-amanitin inhibition. (17 references)

6668 PRESENCE OF AFLATOXIN B_1 IN HUMAN LIVER IN THE UNITED STATES. (Eng.) Phillips, D. L. (Dept. Biochemistry, Cancer Res. Center, Business Loop 70 & Garth Ave., Columbia, MO 65201); Yourtee, D. M.; Searles, S. *Toxicol Appl Pharmacol* 36(2): 403-406; 1976.

A sample of liver tissue was obtained at biopsy from a 56-yr-old man with carcinoma of the rectum and liver to study the in vitro metabolism of aflatoxin B_1. The toxin, apparently environmentally ingested, was present in amounts up to 520 ng/g of wet liver. No other metabolites were detected. Upon incubation of a portion of the liver homogenate with an NADPH-generating system, the amount of aflatoxin B_1 in the liver chloroform-extractable fraction was reduced to 250 ng/g, and another metabolite of higher polarity was observed, to the extent of 40 ng/g. Re-evaluation of the scope and hazard from aflatoxin contamination in the US is suggested. (11 references)

6669 STUDIES ON AFLATOXIN B_1 TOXICITY IN FEMALE RATS PRETREATED WITH AN ORAL CONTRACEPTIVE AGENT. (Eng.) Mgbodile, M. U. K. (Dept. Biochemistry and Nutrition, Meharry Medical Coll., Nashville, TN 37208); Holscher, M. *Food Cosmet Toxicol* 14(3): 171-174; 1976.

The effect of short-term ingestion of an oral contraceptive agent on aflatoxin B_1 hepatotoxicity in female Sprague-Dawley rats was investigated. Oral administration of 100 μg Ovral-28 (which contained 0.5 mg norgestrel and 0.05 mg ethinylestradiol) for 16 consecutive days prior to ip administration of a single dose of 3 mg aflatoxin B_1 diminished the hepatic necrosis observed in rats that received aflatoxin alone. Pretreatment with Ovral-28 also prevented the decrease in the level of hepatic reduced glutathione and partially reversed the decrease in the activity of the hepatic drug-metabolizing enzyme system caused by aflatoxin B_1. (23 references)

6670 LUNG CANCER AND MESOTHELIOMA DURING PROSPECTIVE SURVEILLANCE OF 1249 ASBESTOS INSULATION WORKERS, 1963-1974. (Eng.) Selikoff, I. J. (Environmental Sciences Lab., Mount Sinai Sch. Medicine, City Univ. New York, New York, NY 10029). *Ann NY Acad Sci* 271: 448-455; 1976.

Fifty-nine cases of bronchogenic carcinoma were observed among 1,249 asbestos insulation workers followed prospectively over a 12-yr period (1963-1974). Despite the fact that these men and their medical attendants were aware of the risk of disease and despite the availability of radiologic and clinical surveillance, 57 of the men died. Obviously, the surveillance programs were insufficient to improve the prognosis appreciably. At best, early diagnosis of late disease was achieved. Far more effective measures of preclinical diagnosis are needed if anticipated disease in this group at high risk of cancer is to be treated effectively. There was an important influence of the lapsed period from onset of exposure. Nine cases of pleural mesothelioma and 22 of peritoneal mesothelioma were seen. Effective treatment was absent, and all 31 were dead at the end of the study period. Prospective surveillance with the likelihood of earlier diagnosis failed to improve prognosis in this disease appreciably. (11 references)

6671 INDUSTRIAL MONITORING: A CYTOGENETIC APPROACH. (Eng.) Kilian, D. J. (Dept. Industrial Medicine and Biomedical Res., Dow Chemical U.S.A., Texas Div., Freeport, TX 77541); Picciano, D. J.; Jacobson, C. B. *Ann NY Acad Sci* 269: 4-11; 1975.

The use of cytogenetic monitoring to detect changes induced by occupational exposures to chemicals, particularly to vinyl chloride is described. During a 10-yr period, 43,044 shorthand and conventional karyotypes of 1,689 production workers were studied by chromosome analysis correlated with a standardized medical history. Blood samples were drawn from each individual, slides were prepared, and a metaphase spread was located. The selected cells were photographed, the metaphase spread photographs were evaluated, and anomalous chromosomes were classified and tabulated according to the type of structural aberration. Chromosomes were karyotyped to permit detection of aberrations such as small deletions, translocations, and pericentric inversions. Preliminary data from the cytogenetic analysis of blood samples from 121 vinyl chloride workers were compared with preemployment examination records from 75 individuals who served as controls. The following three differences were seen: vinyl chloride workers showed less chromatid breakage, a greater frequency of dicentric chromosomes, and a lower percentage of abnormal cells than the preemployment comparison group. It is concluded that chromosome analysis is the procedure of choice for objective observation and measurement of possible insults to human genetic material and that the techniques described are the best for the detection of genetic injury at a stage when corrective action can be taken. (8 references)

6672 MIGRATION OF VINYL CHLORIDE FROM PVC PACKAGINGS. (Ger.) vom Bruck, C. G. (Unilever Gesellschaft mbH, Hamburg, West Germany); Eckert, W. R.; Rudolph, F. B. *Fette Seifen Anstrichmittel* 78(8) 334-337; 1976.

Gas chromatographic assay of vinyl chloride (VC) migration in polyvinyl chloride (PVC) or fat simulan HB 307 was made by Puschmann's method with a sensiti ity of 0.00001% (0.1 mg/kg) for PVC and 0.000001% (0.01 mg/kg) for HB 307. VC migration from PVC was directly proportional to the initial VC concentration. In two separate PVC samples the VC level fell from 0.006% to 0.002% and from 0.0017% to 0.0006% after 35 days. At 20 C a linear relation was also obtained for the VC flow into HB 307 for 100 days. At 40 C a max VC concentration was reached in HB 307 in 50-60 days, after which the level gradually fell. The appearance of a max suggests a reflux from HB 307 through PVC into the ambient atmosphere. On the average, an adult will consume about 1 kg of package food per day. Since only a small fraction of that kilogram is in PVC packaging, the threat of VC contamination, even at a 0.006% concentration in PVC, is very small. (4 references)

6673 THORIUM INDUCED TESTICULAR CHANGES IN RATS. (Eng.) Tandon, S. K. (Industrial Toxicology Res. Center, P. B. No. 80, Lucknow, India Mathur, A. K.; Behari, J. R.; Chandra, S. V. *Acta Biol Med Ger* 34: 1835-1842; 1975.

The effect of daily ip administration of thorium nitrate on the testes of albino rats was studied. Sixty rats received 10 mg Th/kg ip/day for 90 days, causing progressive increases in the concentration of metal in the testes accompanied by increasing morphological damage. Thus, the metal exerted a direct toxic effect on testicular tissue. The degenerative changes in the seminiferous tubules increase with the duration of treatment, and after 90 days calcification occurred in about 25% of the tubules and in the connective tissue of the tunica albuginea The higher accumulation of thorium in the organ was mainly due to the poor excretion of this metal. The histopathological changes were accompanied by increased activities of adenosine triphosphatase (77%) and alkaline phosphatase (101%) over 45 days, demonstrating a correlation between biochemical and pathomorphological alterations in the testicular tissue. The increasing concentration of thorium in the teste ith duration of treatment may involve more and more iological ligands in the formation of the complexes, esulting in progressive morphological changes. The xact mode of action of thorium metal on the enzyme ystem is not known. (23 references)

674 METAL-INDUCED INFIDELITY DURING DNA SYNTHESIS.

(Eng.) Sirover, M. A. (Inst. ancer Res., Fox Chase Cancer Center, 7701 Burholme Ave., hiladelphia, PA 19111); Loeb, L. A. *Proc Natl Acad ci USA* 73(7): 2331-2335; 1976.

he effect of several divalent cations on the accur- cy of DNA replication in vitro was examined. Only e^{2+} altered the accuracy of DNA synthesis using urified DNA polymerase from avian myeloblastosis irus. The Be^{2+}-induced base substitutions occurred ith all templates and with all nucleotides tested. quilibrium density centrifugation and processive ydrolysis with snake venom phosphodiesterase sugges- ed that the noncomplementary nucleotides were pres- nt in phosphodiester linkage. Nearest-neighbor tudies indicated that many of the Be^{2+}-induced rrors were present as single base substitutions. he enhancement of error frequency could be dupli- ated by pretreatment of the enzyme, but not the emplate, with Be^{2+}. Glycerol gradient centrifuga- ion dissociated the Be^{2+}-DNA polymerase complex nd restored the initial error frequency of the olymerase. Thus, the weak binding of a metal ation of a DNA polymerase could alter the accu- acy with which that polymerase copied DNA. The ystem may have potential use as a screening tech- ique to detect chemical mutagens and carcinogens. 36 references)

675 A COMPARATIVE STUDY OF DNA-DEPENDENT RNA POLYMERASES FROM RAT ASCITES HEPATOMA CELL JCLEI AND FROM RAT LIVER NUCLEI.

(Eng.) Misumi, H. Dept. Biochemistry, Cancer Inst., Okayama Univ. edical Sch., Okayama 700, Japan). *Acta Med Okayama* 9(6): 405-412; 1975.

NA-dependent RNA polymerases were extracted and artially purified from the nuclei of rat ascites epatoma cells (AH-130) induced by 4-dimethylamino- zobenzene in Donryu rats. The patterns of RNA syn- hesis and the properties of these enzymes were ompared with enzymes from rat liver nuclei. The pecific activity of RNA polymerase in the homogenate rom the AH-130 cell nuclei was equal to that of ormal rat liver nuclei. RNA polymerase was solubil- zed from the homogenate at high ionic strength and eparated into two forms by DEAE-Sephadex column hromatography. These enzymes corresponded to RNA olymerase I and II. RNA polymerase I transcribed ative DNA more effectively than denatured DNA at ow salt concentration, but a high salt concentration NA polymerase I effectively transcribed denatured NA. RNA polymerase II transcribed denatured DNA ore effectively. In AH-130 cells the activity of NA polymerase I was 4 to 5 times higher than RNA olymerase II, and in rat liver the activity of RNA polymerase I was 1.5-2 times higher than RNA polymerase II. The activity of RNA polymerase I in AH-130 cells may have increased by induction. (18 references)

6676 DOSE-RESPONSE HYPERPLASIA AND NEOPLASIA FROM FEEDING N-2-FLUORENYLACETAMIDE (2-FAA) TO BALB/C MICE FOR VARYING TIME INTERVALS.

(Eng.) Haley, T. J. (Dept. Health, Education, and Welfare, Food and Drug Admin., Natl. Center Toxicological Res., Jefferson, AR 72079); Farmer, J.; Jaques, W. E.; Frith, C.; Sprowls, R. W.; Schieferstein, G. *Proc Soc Exp Biol Med* 152(2): 156-159; 1976.

Hyperplasia induced in BALB/c mice by N-2-fluorenylacetamide required the continuous presence of the chemical for its maintenance. Feeding the chemical at levels of 8 to 86 ppm caused a dose-response related urinary bladder hyperplasia and, after 9 - 12 mo, bladder neoplasia at the higher dose levels. Neoplasia of the lungs, liver, parotid gland, lacrimal gland, harderian gland, and submaxillary gland also occurred. Measurement of oncogenic viruses revealed no synergism with the carcinogen and no relationship between virus counts and neoplasia. Calcareous pericarditis was observed, and most of the general toxicological effects occurred in the liver. A pronounced sex difference in response was observed, with the males giving greater responses than the females in all instances. (15 references)

6677 CHANGES IN TEMPLATE PROPERTIES OF CHROMATIN DURING AMINOAZO-CARCINOGENESIS.

(Eng.) Mironov, N. M. (Lab. Biochemistry of Tumors, Inst. Experimental and Clinical Oncology, Acad. Medical Sciences USSR, Moscow, USSR); Adler, V. V.; Sokolov, N. A.; Shapot, V. S. *Bull Exp Biol Med* 81(3): 436-438; 1976.

The ability of deoxyribonucleoproteins (DNP) and purified DNA from the livers of rats fed 3'-methyl-4-dimethylaminoazobenzene (3'-MDAB) to act as templates for RNA synthesis was studied. No differences were seen between experimental and control rats in the electrophoretic spectrum of the total protein of DNP or nonhistone proteins, in the shape of the melting curves of DNA and DNP, or in the template ability of DNA isolated from rat liver. DNP isolated from the livers of rats receiving the carcinogen proved to be a better template for in vitro RNA synthesis (in a system with RNA polymerase from *Escherichia coli*) with low concentrations of precursors of RNA synthesis. If the precursors were present in high concentrations, the template activities of the DNA were equal in the experimental and control animals. The ratio between the RNA polymerase activity of the residue and the supernatant obtained after centrifugation was determined as a measure of the ability of RNA polymerase to dissociate from the complex with chromatin. RNA polymerase activity of the residue, expressed as a fraction of the activity in the supernatant for the control animals and for animals receiving the noncarcinogen 2'-methyl-4-dimethylaminoazobenzene or the carcinogen 3'-MDAB, respectively, was 34%, 24%, and 44% for one form of the enzyme and 38%, 38%, and 66% for another form. The quantity of RNA synthesized indicates the ability of DNP to form an initiating complex with RNA polymerase and the ability of the enzyme to dissociate from DNP after RNA chain growth has stopped. If virtually all the RNA polymerase is bound with DNP (as in high concentrations of DNP and ribonucleoside triphosphates or in isolated nuclei), a reduction in the ability of the DNP-RNA polymerase complex to dissociate may lead to less likelihood of liberation of RNA polymerase from the template and reinitiation of RNA synthesis and, consequently, to a decrease in RNA-synthesizing power of the nuclei. (7 references)

6678 LIPID HYDROPEROXIDE ACTIVATION OF N-HYDROXY-N-ACETYLAMINOFLUORENE VIA A FREE RADICAL ROUTE. (Eng.) Floyd, R. A. (Biomembrane Res. Lab., Oklahoma Medical Res. Foundation, 825 Northeast 13 St., Oklahoma City, OK 73104); Soong, L. M.; Walker, R. N.; Stuart, M. *Cancer Res* 36(8): 2761-2767; 1976.

Linoleic acid hydroperoxide in the presence of methemoglobin or hematin activated the carcinogen N-hydroxy-N-acetyl-2-aminofluorene via the nitroxyl free-radical intermediate into 2-nitrosofluorene and N-acetoxy-N-acetyl-2-aminofluorene. Ascorbate inhibited the activation, in which case the free-radical intermediate was replaced by the ascorbate free radical. Optical kinetics showed that the rate of linoleic acid hydroperoxide decrease paralleled the rate of N-hydroxy-N-acetyl-2-aminofluorene decrease and the rate of 2-nitrosofluorene increase. The stoichiometry of the reaction was such that, for every two linoleic acid hydroperoxide molecules consumed, two N-hydroxy-N-acetyl-2-aminofluorene molecules were oxidized and one 2-nitrosofluorene and one N-acetoxy-N-acetyl-2 aminofluorene molecule were formed. (21 references)

6679 AN INHIBITORY EFFECT OF SALIVARY GLAND EXTIRPATION ON THE INDUCTION OF MAMMARY TUMORS IN RATS BY N,N'-2,7-FLUORENYLENEBISACETAMIDE. (Eng.) Hirano, T. (Experimental Pathology Lab., Central Res. Div., Takeda Chemical Industries, Ltd., 17-85, Juso-honmachi 2-chome, Yodogawa-ku, Osaka 532, Japan); Morris, H. P.; Jackson, C. M.; Lewis, J. W. *Acta Pathol Jpn* 26(3): 341-356; 1976.

N,N'-2,7-Fluorenylenebisacetamide (2,7-FAA) was administered po to 34 female AXC/I rats. At 10-12 wk of age, 19 had had their salivary glands removed surgically. Six of the 15 unoperated rats developed mammary carcinomas and 7 developed tumors at other sites, but none of 19 operated rats had mammary tumors; however, 8 rats had tumors at other sites. No tumor developed in four operated control rats on a normal diet. The results demonstrated that pretreatment with extirpation of the salivary glands inhibited mammary tumor induction in rats by 2,7-FAA although it did not inhibit the induction of other tumor types. Ovarian atrophy and hepatic necrosis occurred in both operated and unoperated rats ingesting 2,7-FAA but did not effect the drug-induced carcinogenesis. Lower body weight was observed in the operated rats, but it was not considered the major cause of a complete inhibition of mammary tumor induction. (36 references)

6680 N-NITROSO-BIS(2-ACETOXYPROPYL)AMINE AS A FURTHER PANCREATIC CARCINOGEN IN SYRIAN GOLDEN HAMSTERS. (Eng.) Pour, P. (Eppley Inst. for Res. in Cancer, Univ. Nebraska Medical Center, 42nd St. and Dewey Ave., Omaha, NB 68105); Althoff, J.; Gingell, R.; Kupper, R.; Kruger, F.; Mohr, U. *Cancer Res* 36(8): 2877-2884; 1976.

The carcinogenicity of N-nitroso-bis(2-acetoxypropyl)amine, a possible β metabolite of N-nitroso-di-n-propylamine, was studied in the Syrian golden hamster. After a single sc treatment, the pancreas was the most affected organ, followed by the liver, respiratory tract, and kidneys. However, repeated application resulted in a higher incidence of neoplasms of the respiratory tract than of the pancreas and kidneys. The effect of N-nitroso-bis(2-acetoxypropyl)amine on toxicity, target tissues, and carcinogenicity was similar to that of N-nitroso-bis(2-hydroxypropyl)amine. N-nitroso-bis(2-acetoxypropyl)amine was readily deesterified to N-nitroso-bis-(2-hydroxypropyl)amine in vivo and in vitro, confirming that both compounds have similar metabolic pathways. (15 references)

6681 IDENTIFICATION OF POLYNUCLEAR AROMATIC HYDROCARBONS IN CIGARETTE SMOKE AND THEIR IMPORTANCE AS TUMORIGENS. (Eng.) Akin, F. J. (USDA, Agricultural Res. Service Southern Region, Richard B. Russell Agricultural Res. Center, P.O. Box 5677, Athens, GA 30604); Snook, M. E.; Severson, R. E.; Chamberlain, W. J.; Walters, D. B. *J Natl Cancer Inst* 57(1): 191-195; 1976.

Fraction F_{20}, which has been the most tumorigenic neutral fraction of cigarette smoke condensate (CSC), was separated by gel filtration chromatography into refined subfractions for identification of polynuclear aromatic hydrocarbons (PAH) and for bioassay on mouse skin. Several hundred PAH were positively identified. Subfraction F_{55}, containing most of the carcinogenic PAH as well as numerous unidentified components, was almost as tumorigenic to 7,12-dimethylbenz[a]anthracene (DMBA)-pretreated female outbred CD-1 mice as was F_{20}. When F_{55} was separated into two parts, the first containing unidentified material ($F_{55}A$) and the second containing the PAH ($F_{55}B$), neither was significantly tumorigenic. $F_{55}B$, combined with two other active fractions from the neutral and the acidic portions of CSC, exhibited a synergistic tumorigenic effect on DMBA-pretreated mice. The results support the concept that the PAH in cigarette smoke must interact with other components in order to exert a tumorigenic effect. (12 references)

5682 EFFECTS OF INSULIN, PROLACTIN, PROGESTERONE, AND ESTRADIOL ON DNA SYNTHESIS IN RGAN CULTURE OF 7,12-DIMETHYLBENZ(A)ANTHRACENE-NDUCED RAT MAMMARY TUMORS. (Eng.) Pasteels, J. L. Laboratoire d'Histologie, Faculte de Medecine, niversite Libre de Bruxelles, Brussels, Belgium); euson, J.- C.; Heuson-Stiennon, J.; Legros, N. *ancer Res* 36(7): 2162-2170; 1976.

he effect of various hormones or hormone combinaions on DNA synthesis was investigated in organ ultures of 20 dimethylbenz(a)anthracene-induced rat ammary tumors. Three tumors were insulin-indepenent and totally insensitive to all other hormones ested. Seventeen tumors were insulin-dependent for NA synthesis and, in the presence of insulin, dislayed variable responses to the other hormones. ine of 12 such tumors were significantly stimulated y the combination of prolactin and progesterone. iven alone, these hormones were effective in only 5% of the tumors tested. Estradiol at 0.001 or 1.0 g/ml acted in a reverse manner to progesterone and as inhibitory in combination with prolactin in 40% f cases. It was ineffective alone except in 1 of 10 ases in which a stimulatory effect was recorded. A omparison in four tumors between estimation of DNA ynthesis (^{3}H-thymidine incorporation into DNA) and olchicine-blocked mitoses demonstrated a good conordance. (32 references)

683 EXPERIMENTAL BLADDER TUMOR INDUCTION, PROPAGATION, AND THERAPY. (Eng.) Williams, . D. (Roswell Park Memorial Inst., New York State ept. Health, State Univ. New York at Buffalo, Bufalo, NY 14263); Murphy, G. P. *Urology* 8(1): 39-42; 976.

emale Sprague-Dawley rats, female Fisher 344 rats, nd C_3H/He mice (200 animals of each species) were valuated for the effect of po administration of .10% N-[4-(5-nitro-2-furyl)-2-thiazolyl]formamide FANFT). The dosages were calculated to be 0.07 g/wk er rat and 0.035 g/wk per mouse. The drug produced nly from 33% to 40% bladder tumors in several experients in the Fisher rats. Reproducible transplantbility of these tumors was not demonstrable in the ame inbred strain. In addition, treatment with itomycin C as an effective chemotherapeutic agent as not detectable in part, since the comparable ercentage of control bladder tumor growth was low. 15 references)

684 PANCREATIC NEOPLASMS INDUCED IN SYRIAN GOLDEN HAMSTERS. I. SCANNING ELECTRON ICROSCOPIC OBSERVATIONS. (Eng.) Althoff, J. (Eppley nst. Res. in Cancer, Univ. Nebraska Medical Center, 2nd and Dewey Ave., Omaha, NB 68105); Pour, P.; alick, L; Wilson, R. B. *Am J Pathol* 83(3): 517-530; 976.

yrian golden hamsters were treated with N-nitrosois(2-hydroxypropyl)amine for 10-25 wk, and the ancreases were examined under scanning electron microscopy (SEM). The neoplasms originated from the ductal epithelium and developed progressively. Adenomas were lined by epithelium of differing cell types, ranging from a flat singly ciliated form to cuboidal-columnar types or to mixed cell populations. The epithelial lining of the ductal carcinomas exhibited tubular and papillary cystic spaces, and cell surfaces were similar to the cuboidal and columnar epithelium of adenomas and of ductal epithelial hyperplasia. However, microvilli were dense and of varied lengths. The SEM observations correlated with patterns seen in routine histologic preparations. (8 references)

6685 MOLECULAR STRUCTURES OF THE CHEMICAL CARCINOGENS 7-CHLOROMETHYLBENZ[a]ANTHRACENE AND 7-CHLOROMETHYL-12-METHYLBENZ[a]ANTHRACENE. (Eng.) Glusker, J. P. (Fox Chase Cancer Center, Philadelphia, PA 19111); Zacharias, D. E.; Carrell, H. L. *Cancer Res* 36(7): 2428-2435; 1976.

The three-dimensional structures of two carcinogens, 7-chloromethyl-12-methylbenz(a)anthracene (7-$ClCH_2$-MBA) and 7-chloromethylbenz(a)anthracene (7-$ClCH_2$-BA) have been determined by x-ray crystallographic techniques. Both compounds are carcinogenic and are believed to act by alkylating DNA. However, the first has a nonplanar ring system, whereas the second has a planar ring system. The nonplanarity of 7-$ClCH_2$-MBA results from steric hindrance between a hydrogen atom of the 12-methyl group and a hydrogen atom on the (a) ring. This molecule cannot be made planar unless the 12-methyl group or the (a) ring is removed. It is concluded that the carcinogenic activity of these compounds does not correlate with planarity of the ring system. This implies that, if DNA is the critical target of attack by these carcinogens, complete intercalation of the aromatic ring system of the carcinogen between the bases of DNA is not a likely mechanism of carcinogenic action. The results are more consistent with a model for a common interaction of the two carcinogens with DNA, in which they alkylate the bases of DNA and then lie with their long axes approximately parallel to the helix axis, probably in the major groove. (35 references)

6686 ROLE OF AGE AND SEX IN CHRONIC THYROIDITIS IN RATS FED 3'-METHYL-4-DIMETHYLAMINOAZOBENZENE. (Eng.) Reuber, M. D. (Lab. Biology, NCI, Bethesda, MD); Glover, E. L. *Vet Pathol* 13(4): 295-302; 1976.

Differences in age and sex in the thyroiditis induced in inbred Buffalo strain rats by 3'-methyl-4-dimethylaminoazobenzene (3'-Me-DAB) are described. The rats started at 4, 8, 12, 24, or 52 wk of age on 0.06% 3'-Me-DAB in a low-protein, choline-deficient diet. The carcinogen-containing diet was fed ad libitum for 4-wk periods followed by 1 wk on the basal diet until the carcinogen had been administered for 12 wk. The animals were then given laboratory pellets until the end of the experiment (24 wk after the start). Males and females 8 wk old were most susceptible to the development of chronic thyroiditis. Thyroiditis occurred in females 4, 8, and 12 wk of age at the start of the experiment more often than in males of the same ages. Only 10 rats with thyroiditis did not have carcinomas of the liver. Some rats also had chronic dacryoadenitis. There was a direct relationship between thyroiditis and development of hepatic carcinomas in the rats given 3'-Me-DAB. There was also a relationship between having carcinomas and the sex of the rats. Male rats that developed carcinomas (except for some 8-wk-old rats) did not have thyroiditis, but the female rats with thyroiditis did not have carcinomas of the liver. (29 references)

6687 CHANGES IN THE MATRIX PROPERTIES OF CHROMATIN DURING AMINOAZO CARCINOGENESIS.

(Rus.) Mironov, N. M. (Inst. Experimental and Clinical Oncology, Acad. Medical Sciences USSR, Moscow, USSR); Adler, V. V.; Sokolov, N. A.; Shapot, V. S. *Biull Eksp Biol Med* 81(3): 363-365; 1976.

Male rats were fed a diet containing the carcinogen 3-methyl-4-dimethylaminoazobenzol. No changes occurred either in the electrophoretic total protein spectrum of deoxyribonucleoprotein (DNP) or in nonhistone proteins; the character of the DNA and DNP melting curves or the matrix capacity of DNA extracted from the rat liver also remained unchanged. The DNP of the tumor tissue was more active in the capacity of the matrix for the RNA synthesis in vitro with the animal or bacterial RNA polymerase with low substrate concentrations (2×10^{-5} M). However, with high concentrations of each one of the substrates (2×10^{-3} M), RNA synthesis was the same as in the control. With nuclear lysis in the solution with alkaline pH the percentage of RNA polymerase activity decreased considerably in rats given the carcinogen. (7 references)

6688 4-AMINOANTIPYRINE AS A CHROMOGENIC AGENT FOR AROMATIC AMINE DETERMINATION IN NATURAL WATER.

(Eng.) Ei-Dib, M. A. (Water Pollution Control, Natl. Res. Centre, Dokki, Cairo, Egypt); Abdel-Rahman, M. O.; Aly, O. A. *Water Res* 9(5/6): 513-516; 1975.

The feasibility of 4-aminoantipyrine (4-AAP) as a chromogenic agent for the colorimetric determination of aromatic amines was studied. The effects of pH and reducing and interfering compounds were evaluated. The molar absorpitivity of the AAP color complex varied greatly according to the chemical structure of amine tested and the nature and position of the substituents. Maximum color development occurred within 1 min, and the color maintained its stability for 10 min. The method was not sensitive to chloro-, nitro-, and p-substituted anilines or to polycyclic aromatic amines. Determination of other aromatic amines was possible in the range of 0.1 mg/l. Precision of the method was greatly increased when the amount of the existent amine ranged between 40 and 100 μg. The molar absorptivity of the 4-AAP-dye complexes was affected by steric hindrance and lability of the lone pair of electrons of the amino nitrogen. (23 references)

6689 CHEMICAL CARCINOGENESIS IN THE HAMSTER CHEEK POUCH: INFLUENCE OF INHIBITORS AND INDUCERS OF ALKALINE PHOSPHATASE.

(Eng.) Rubin, D. (Dept. Pathology, Hadassah Univ. Hosp., Jerusalem, Israel); Levij, I. S. *Pathol Microbiol* 43(1): 26-30; 1975.

Squamous cell carcinomas were induced in the cheek pouches of 75 Syrian golden hamsters with 0.5% 9,10-dimethyl-1,2-benzanthracene. The carcinogenesis was inhibited by 0.3% phenylphosphate, an inducer of alkaline phosphatase. Orthophosphate and 1-phenylalanine, which inhibit alkaline phosphatase, had a promoting effect on tumor formation. The results concurred with those of previous studies. The effect of the studied substances on carcinogenesis was apparently unrelated to the presence of phenyl or phosphate groups or of steroid rings, but rather to the potential of the tested substances to induce or inhibit alkaline phosphatase activity. (9 references)

6690 A NEW CLASS OF INHIBITORY CYTOCHROME P-450 COMPLEXES FORMED DURING METABOLISM: A COMPARISON WITH AMPHETAMINE AND SKF 525-A TYPE COMPLEXES.

(Eng.) Franklin, M. R. (Depts. Biopharmaceutical Sciences and Pharmacology, Univ. Utah, Salt Lake City, UT 84112). *Chem Biol Interact* 14(3/4): 337-346; 1976.

During the metabolism of p-chloroaniline, sulfanilamide, 2-methylindoline, and dapsone, complexes with cytochrome P-450 were formed that absorbed maximally at 448, 450, 451, and 452 nm, respectively. These complexes were similar to those from amphetamines (456 nm) and 2-diethylaminoethyl 2,2-diphenylvalerate (SKF 525-A) (452 nm), in the conditions for and rate of formation and their inhibition of ethylmorphine N-demethylase activity. Similarly, their formation was mainly a property of phenobarbital-induced cytochrome P-450 and was inhibited by comparable concentrations of metyrapone and 2-O-iodophenoxymethylimidazole. Unlike the complexes from amphetamine and SKF 525-A, those formed from p-chloroaniline, sulfanilamide, 2-methylindoline, and dapsone were unstable in the presence of sodium dithionite. (41 references)

6691 EVIDENCE FOR THE INVOLVEMENT OF CYTOCHROME P-450 IN REDUCTION OF BENZO(A)PYRENE 4,5-OXIDE BY RAT LIVER MICROSOMES.

(Eng.) Kato, R. (Fujisawa Res. Lab., Fujisawa Pharmaceutical Co. Ltd., 1-6, 2-Chome, Kashima, Yodogawa-ku, Osaka 532, Japan); Iwasaki, K.; Shiraga, T.; Noguchi, H. *Biochem Biophys Res Commun* 70(3): 681-687; 1976.

The character and mechanism of the reduction of aromatic hydrocarbon epoxides were studied in liver microsomes from male Sprague-Dawley rats. Benzo(a)pyrene 4,5-oxide was reduced to benzo(a)pyrene by microsomes in the presence of NADPH. Carbon monoxide and oxygen inhibited this reduction. The activity was almost lacking in newborn rats. In 28-day-old rats the reduction rate was about 50% of that in adult rats. Phenobarbital as well as 3-methylcholanthrene pretreatment increased the epoxide reduction. Additions of flavin mononucleotide or methylviologen stimulated the epoxide reduction; dimethylaniline N-oxide and cumene hydroperoxide were inhibitory. These results indicate that benzo(a)pyrene 4,5-oxide is reduced by the reduced form of cytochrome P-450. (14 references)

6692 INDUCIBLE MONOOXYGENASE ACTIVITIES AND 3-METHYLCHOLANTHRENE-INITIATED TUMORIGENESIS IN MOUSE RECOMBINANT INBRED SUBLINES. (Eng.) Atlas, S. A. (Section on Pharmacogenetics and Molecular Teratology, Developmental Pharmacology Branch, Natl. Inst. Child Health and Human Development, NIH, Bethesda, MD 20014); Taylor, B. A.; Diwan, B. A.; Nebert, D. W. *Genetics* 83(2): 537-550; 1976.

A pair of closely related sublines that differ with respect to the *Ah* locus (for *a*romatic *h*ydrocarbon responsiveness) were used to identify or confirm the pleiotropic effects of the locus in mice that controls the formation of cytochrome P_1-450. The lines were derived by sibling-mating without selection from (C57L/J x AKR/J)F_2 mice; the two sublines were separated at the F_{12} generation. Ten microsomal monooxygenase activities and one cytosol enzyme activity known to be associated with the ∇η locus were similarly associated with cytochrome P_1-450 formation in these recombinant inbred sublines as well. Nine additional hepatic monooxygenase activities were found not to be associated with the *Ah* locus; certain of these activities were increased slightly, following treatment of nonresponsive as well as responsive mice with polycyclic aromatic compounds. The *Ahb*-containing subline was highly susceptible to 3-methylcholanthrene-induced subcutaneous sarcomas, but the Ahd-containing subline was relatively resistant. These results emphasize the potential importance of this particular enzyme for the study of coordinated regulation in mammals. (54 references)

6693 INDUCTION OF ARYL HYDROCARBON HYDROXYLASE IN RODENT LUNG BY CIGARETTE SMOKE: A POTENTIAL SHORT-TERM BIOASSAY. (Eng.) Akin, F. J. (United States Dept. Agriculture, Agricultural Res. Service. Richard B. Russell Agricultural Res. Center, Athens, GA 30604); Benner, J. F. *Toxicol Appl Pharmacol* 36(2): 331-337; 1976.

The use of aryl hydrocarbon hydroxylase (AHH) induction as a short-term bioassay for assessing cigarette toxicity was tested in female Sprague-Dawley rats. Syrian golden hamsters, HA/IRC random-bred mice, and C57BL/6J inbred mice. AHH activity was increased several fold in the lungs of all species after inhalation of cigarette smoke. Hamsters had a low basal activity of lung AHH, but showed the greatest inducibility (the ratio of induced to noninduced enzyme). Inducibility was lower, but the actual levels of enzyme activity, both basal and induced, were higher in mice and highest in rats. Several criteria were met that could qualify the lung AHH assay as a short-term bioassay to aid in the measurement of cigarette toxicity. Within a relatively narrow range, AHH activity increased with the number of cigarettes smoked. In tests with standard reference cigarettes and three commerical brands, cigarettes that delivered high levels of total particular matter (TPM) in the smoke induced AHH to the highest degree; measures that reduced the TPM, primarily filtering methods, reduced the enzyme-inducing effect. With regard to filtering methods, the type of cigarettes reported to cause the most extensive damage to the respiratory tract of animals in chronic inhalation studies caused the greatest enzyme induction in acute experiments. Assay results could be obtained rapidly; max induction occurred within 24 hr after smoke exposure. (24 references)

6694 DEPRESSION OF THE HEPATIC CYTOCHROME P-450 MONO-OXYGENASE SYSTEM BY ADMINISTERED TILORONE (2,7-BIS[2-DIETHYLAMINO)ETHOXY]FLUOREN-9-ONE DIHYDROCHLORIDE). (Eng.) Renton, K. W. (Dept. Pharmacology, Univ. Minnesota Coll. Medical Sciences, Minneapolis, MN 55455); Mannering, G. J. *Drug Metab Dispos* 4(3): 223-231; 1976.

The antiviral agent tilorone-HCl (50 mg/day po for 4 days) was administered to male Holtzman or Charles River Long-Evans rats. The treatment resulted in losses of hepatic microsomal ethylmorphine N-demethylase, benzo(a)pyrene hydroxylase, and aniline hydroxylase activities of 50%, 44%, and 22% respectively. Microsomal levels of cytochrome P-450 and NADPH-cytochrome c reductase were lowered by 40% and 20%, respectively, but levels of cytochrome b_5 and NADH-cytochrome c reductase remained unchanged. After a single po dose, a loss of 38% of the microsomal cytochrome P-450 and 25% of the ethylmorphine N-demethylase activities occurred within 24 hr; recovery was complete within 8-10 days. Hexobarbital sleeping times and blood levels were elevated after tilorone administration (20 or 50 mg/kg/day for 4 days). In vitro, tilorone•HCl showed no inhibitory effect on microsomal drug metabolism nor did it affect the cytochrome P-450 content of the microsomes. The rate of incorporation of δ-amino(^{3}H)levulinic acid into cytochrome P-450 was not affected by tilorone-HCl. (27 references)

6695 ELUCIDATION OF HYDROCARBON STRUCTURE IN AN ENZYME-CATALYZED BENZO(A)PYRENE-POLY(G) COVALENT COMPLEX. (Eng.) Meehan, T. (Lab. Chemical Biodynamics, Lawrence Berkeley Lab., Univ. California, Berkeley, CA 94720); Straub, K.; Calvin, M. *Proc Natl Acad Sci USA* 73(5): 1437-1441; 1976.

Benzo(a)pyrene was covalently attached to poly(G) by liver microsomes from rats pretreated with 3-

methylcholanthrene. The complex was hydrolyzed with enzymes or base, and the products were isolated by Sephadex chromatography. Absorbance and fluorescence spectra of the products fit that of a red-shifted pyrene aromatic system and suggested that metabolism occurred at the 7-, 8-, 9-, and 10-positions of the hydrocarbon. Benzanthracene or chrysene fluorescence was not observed in these preparations. Benzo(a)pyrene derivatives were synthesized and purified by high-pressure liquid chromatography. Dehydration of 7,8-dihydroxy-7,8,9,10-tetrahydrobenzo(a)pyrene resulted in the formation of small amounts of 7-oxo-7,8,9,10-tetrahydrobenzo(a)pyrene. A 7-keto species also occurred after similar treatment of the hydrocarbon-poly(G) hydrolysis products. There was no evidence of dehydration at the 9,10-positions. The hydrocarbon covalently bound to poly(G) was, therefore, a derivative of 7,8-dihydroxy-7,8,9,10-tetrahydrobenzo(a)pyrene with nucleic acid substitution at C-10 or C-9. (21 references)

6696 INDUCTION OF BENZO[A]PYRENE MONOOXYGENASE IN LIVER CELL CULTURE BY THE PHOTOCHEMICAL GENERATION OF ACTIVE OXYGEN SPECIES. EVIDENCE FOR THE INVOLVEMENT OF SINGLET OXYGEN AND THE FORMATION OF A STABLE INDUCING INTERMEDIATE. (Eng.) Paine, A. J. (Biochemical Mechanisms Section, M.R.C. Toxicology Unit, Medical Res. Council Labs., Woodmansterne Road, Carshalton, Surrey 5M5 4EF, England). *Biochem J* 158(1); 109-117; 1976.

The different excited states of oxygen, produced by illumination of a culture medium containing riboflavin, were studied to determine whether any were responsible for enzyme induction in cell culture. The generation of excited states of oxygen resulted in stimulation of benzo(a)pyrene 3-monooxygenase, a cytochrome P-450-linked monooxygenase. The same large increase in monooxygenase activity occurred when the medium was illuminated in the absence of cells and stored in the dark for 24 hr before contact with the cells. This indicated that stimulation was due to the formation of a stable inducer in the culture medium. Further experiments showed that the stable inducer is due to the photo-oxidation of an amino acid. Experiments based on the use of molecules that scavenge particular active oxygen species demonstrated that only those that scavenge singlet oxygen inhibit the stimulation. It is suggested that singlet oxygen generation within cells may be a common factor linking the many structurally diverse inducers of the enzyme system. (42 references)

6697 IN VITRO BINDING OF ^{3}H-BENZO(a)PYRENE TO CHROMATIN DNA. (Eng.) Vaught, J. B. (Dept. Cell and Molecular Biology, Medical Coll. Georgia, Augusta, GA 30902); Bresnick, E. *Life Sci* 18(2): 1167-1170; 1976.

Chromatin was prepared from C3H/f- mouse liver and incubated in an in vitro binding assay containing ^{3}H-benzo(a)pyrene and an NADPH-generating system. Binding to chromatin DNA was stimulated by microsomes from 3-methylcholanthrene-pretreated mice. This incubation system is an improvement over previous ones in which purified DNA was employed as the target macromolecule in that the conditions better approximate those present in the cell; i.e., the genetic material is 'coated' with nuclear protein. (11 references)

6698 (±)-7α,8β-DIHYDROXY-9β,10β-EPOXY-7,8,9,10-TETRAHYDROBENZO[a]PYRENE IS AN INTERMEDIATE IN THE METABOLISM AND BINDING TO DNA OF BENZO[a]PYRENE. (Eng.) King, H. W. (Chemical Carcinogenesis Div., Inst. Cancer Res., Pollards Wood Res. Station, Nightingales Lane, Chalfont St. Giles, Buckinghamshire HP8 4SP, Great Britain); Osborne, M. R.; Beland, F. A.; Harvey, R. G.; Brookes, P. *Proc Natl Acad Sci USA* 73(8): 2679-2681; 1976.

A method for the separation of the reaction products of two geometrical isomers of benzo[a]pyrene diolepoxide with DNA is described. The addition of borate buffer to the aqueous methanol used to elute hydrocarbon-deoxyribonucleoside derivatives from an LH 20 Sephadex column resulted in the separation of the products of reaction with DNA of the stereoisomers, (±)-7α,8β-dihydroxy-9α,10α-epoxy- and (±)-7α,8β-dihydroxy-9β,10β-epoxy-7,8,9,10-tetrahydrobenzo[a]pyrenes; i.e., the syn- and anti-benzo[a]pyrene diolepoxide, respectively. This technique showed that the microsome-mediated binding to DNA of benzo[a]pyrene-7,8-dihydrodiol involved exclusively the anti-benzo[a]pyrene diolepoxide. The benzo[a]pyrene binding to DNA that occurred on exposure of BHK21/C13 cells to this carcinogen resulted predominantly by reaction of the anti-benzo[a]pyrene diolepoxide. However, in this case other derivatives, including the syn-benzo[a]pyrene diolepoxide, might also be involved. (13 references)

6699 HIGH-PRESSURE LIQUID CHROMATOGRAPHIC SEPARATION OF 10 BENZO(A)PYRENE PHENOLS AND THE IDENTIFICATION OF 1-PHENOL AND 7-PHENOL AS NEW METABOLITES. (Eng.) Selkirk, J. K. (NCI, NIH, Bethesda, MD 20014); Croy, R. G.; Gelboin, H. V. *Cancer Res* 36(3): 922-926; 1976.

Many of the metabolites of benzo(a)pyrene (BP), a potent carcinogen, may be activated carcinogenic intermediates. High-pressure liquid chromatography has been used to separate and identify these metabolites. Ten synthetic phenols of BP were separated and identified by several cycles through a DuPont Model 830 high-pressure liquid chromatograph fitted with two Zorbax-sil columns (25 cm) and an 8-µl UV flow cell. The columns and cell were connected to a six-port valve assembly to direct flow toward the two columns in series and then through the UV cell or with flow through the cell between columns. The solvent mixture was hexane:dioxane (9:1), with 40 µl formic acid per 200 ml solvent. The system was run at room temperature with a pressure of 1,800 psi. The peak retention times and UV spectra were compared to authentic standards. This system was used to separate and identify the phenolic metabolites formed when BP was incubated with rat liver microsomes. Two new metabolites, 1-hydroxybenzo(a)pyrene and 7-hydroxybenzo(a)pyrene, were separated, identified, and described. (26 references)

6700 BENZO(A)PYRENE CONTENTS IN SMOKED FISH. (Ger.) Steinig, J. (Bundesforschungsanstalt fuer Fischerei, Institut fuer Biochemie und Technologie, Palmaille 9, D-2 Hamburg 50, West Germany); Meyer, V. *Lebensmittel Wiss Technol* 9(4): 215-217; 1976.

Thin layer chromatographic assay of benzo(a)pyrene (BP) in various fish (mackerel, eel, and halibut) smoked at 70-90 C for 4 hr in conventional ovens is reported. The smoke was generated by a fire source directly under the fish; most of the smoking by commercial kilns is by this direct exposure. Prior studies showed an average recovery rate of 50%-75% by the technique used with 25% of the agent lost in chromatographic plate elution. Based on 100% recovery, the BP range for fish skin was 19-74 ppb. The BP content of edible portions was generally below 1 ppb (0.47-1.4 ppb), except for 2.6-3.3 ppb for eels. There was no correlation between fat content and BP level. Cut fish without the natural filtration of skin had BP concentrations of 1.6-3.7 ppb. (10 references)

6701 QUANTITATIVE DETERMINATION OF BENZO(a)-PYRENE IN CIGARETTE SMOKE CONDENSATE BY HIGH-PRESSURE LIQUID CHROMATOGRAPHY. (Ger.) Klimisch, H.-J. (BASF-WPF, D-6700 Ludwigshafen, West Germany); Ambrosius, D. *Z Anal Chem* 280(5): 377-379; 1976.

The separation and concentration of polycyclic aromatic hydrocarbons from polar substances and aliphatic hydrocarbons are described. By liquid-liquid distribution and column chromatography with silica gel and aluminum oxide, benzo(a)pyrene (BP) was concentrated from cigarette smoke condensate and separated by high-pressure liquid chromatography. The BP concentration amounted to 5% of the dry condensate. Selective separation involved a cross-linked cellulose acetate column to avoid perylene contamination. BP was quantitatively assayed by a fluorescence detector with limits of 10-30 ng/5µl injection volume. (9 references)

6702 DISPLACEMENT OF TRITIUM FROM 6-TRITIO-BENZO(A)PYRENE ON COVALENT BINDING TO DNA. (Eng.) Blackburn, G. M. (Dept. Chemistry, Univ. Sheffield, Sheffield S3 7HF, England); Milne, G. M.; Orgee, L. *J Chem Soc* [*Chem Comm*] (10): 359-360; 1976.

6-Tritiobenzo(a)pyrene was prepared from 6-iodobenzo(a)pyrene via lithiation and reaction with ^3H-H_2O. Photochemical binding of this material to DNA resulted in a loss of 92% of its ^3H content, but binding using rat liver microsomes showed a loss of only 20% of tritium. At the lowest levels of hydrocarbon association with DNA, the 3H: ^{14}C ratio exceeded that of the initial physical complex, and some 5 µmole hydrocarbon/mole DNA base pairs remained associated with DNA in unirradiated samples and showed no loss of ^3H. (10 references)

6703 COLON CARCINOGENESIS IN GERM-FREE RATS WITH INTRARECTAL 1,2-DIMETHYLHYDRAZINE AND SUBCUTANEOUS AZOXYMETHANE. (Eng.) Reddy, B. S. (Naylor Dana Inst. for Disease Prevention, American Health Foundation, Valhalla, NY 10595); Narisawa, T.; Weisburger, J. H. *Cancer Res* 36(8): 2874-2876; 1976.

The effect of intestinal microflora on colon carcinogenesis induced by 1,2-dimethylhydrazine and azoxymethane was studied in germ-free and conventional female Fischer rats. At 7 wk of age, the rats were treated with 20 weekly intrarectal 1,2-dimethylhydrazine (20 mg/kg/wk) or sc azoxymethane (10 mg/kg/wk) doses, and then they were autopsied 15 wk later. Tumors were induced in the small intestine and colon of rats treated with intrarectal 1,2-dimethylhydrazine. The number of rats with colon tumors and the multiplicity of tumors were decreased in germ-free rats, compared with conventional ones. Azoxymethane given sc increased the incidence and multiplicity of colon tumors in germ-free rats, compared with conventional controls. It is concluded that intestinal microflora alter the carcinogenic and/or cocarcinogenic effects of compounds in the large intestine. (16 references)

6704 PROLIFERATIVE ACTIVITY OF THE EPITHELIUM OF THE RAT LARGE INTESTINE DURING CARCINOGENESIS. (Eng.) Pozharisskii, K. M. (Lab. Experimental Tumors, N. N. Petrov Res. Inst. Oncology, Ministry Health USSR, Leningrad, USSR). *Bull Exp Biol Med* 81(1): 76-78; 1976.

The proliferative activity of enterocytes of the descending colon was studied and compared with the corresponding activity in the ileum of male rats at different stages of intestinal tumor induction with 1,2-dimethylhydrazine (DMH) (21 mg/kg/wk sc). The labeling and mitotic indices were used as parameters of enterocyte proliferation; the ratio between the phases of mitosis and the number of pathological mitoses was also determined. The animals were killed at 1-mo intervals for 6 mo, when all had developed multiple intestinal tumors. At 1 mo there was a sharp increase in the number of pathological mitoses (up to 51%) and a change in the ratio between mitosis phases, with marked predominance of metaphases (up to 73%) in the epithelium of the descending colon; these indices remained stable at 56.5%-60%. From the third month there was an increase in the labeling (especially in carcinoma in situ) and mitotic indices in the descending colon. A variety of pathological mitoses was observed (bridges, delay in separation of chromosomes and their fragments, scattering of chromosomes, hollow and triradial metaphases, monocentric and multipolar mitoses, etc.), but there was a definite predominance of delayed separation of chromosomes and their fragments in metakinesis (12%-17%) and of c mitoses (10%-20%) both in microscopically unchanged mucous membranes and in developing adenocarcinomas. In the epithelium of the ileum, where tumors never develop, proliferative activity and the mitotic index were unchanged. These findings suggest that the disturbance of proliferation plays an important role in malignant change and that biological malignant transformation begins long before it is exhibited morphologically. (10 references)

6705 DIFFERING CARCINOGENIC ACTIVITY IN BD RATS OF 1-PHENYL- AND 1-(PYRIDYL-3)-3,3-DIETHYLTRIAZENE AFTER SINGLE DOSES ON DAYS 1, 10, OR 30 OF LIFE. (Ger.) Ivankovic, S. (Institut fuer Toxikologie und Chemotherapie, Deutsches Krebsforschungszentrum Heidelberg, Im Neuenheimer Feld 280, D-6900 Heidelberg, West Germany); Port, R.; Preussmann, R. Z *Krebsforsch* 86(3): 307-313; 1976.

1-Phenyl-3,3-diethyltriazene (PHT) and 1-(pyridyl-3)-3,3-diethyltriazene (PYT) were given to BD rats at 50-mg/kg doses sc on postpartum days 1, 10, and 30 and the animals were allowed to die spontaneously. Neurotumors developed in 243-763 days in 3/11 rats receiving PHT on day 1; these included neuromas, ependymoma, and oligoastrocytoma. Two tumors, oligoastrocytoma and oligodendroglioma, appeared at 407 to 620 days in 2/16 rats receiving PHT on day 30; the mean lifetime of these rats was 630 days. After PYT treatment on day 1, 10/12 animals were affected with 12 neuromas, 1 ependymoma, and 1 oligoastrocytoma 191-621 days posttreatment. After PYT on day 10, 21/31 animals had 30 tumors, 19 of them neurological (9 neuromas) with 6 renal and 1 rectal adenocarcinoma; onset was 227-610 days. PYT on postpartum day 30 elicited 11 tumors in 10/20 rats with induction times of 370-854 days. They included four adenocarcinomas, one adenosarcoma, one light-cell carcinoma, two ependymomas, one polymorphous sarcoma, one leukemia, but only three neurotumors. The PHT-PYT differences are significant for treatment days, 10, and 13 at $P < 0.025$, $P < 0.001$, and $P < 0.01$, respectively. (19 references)

6706 AN ASSESSMENT OF THE CARCINOGENICITY OF ISONIAZID IN PATIENTS WITH PULMONARY TUBERCULOSIS. (Eng.) Stott, H. (MRC Tuberculosis and Chest Diseases Unit, Brompton Hosp., Fulham Road, London SW3 6HP England); Peto, J.; Stephens, R; Fox, W. *Tubercle* 57(1): 1-15; 1976.

The carcinogenicity of isoniazid was assessed by conducting a long-term follow-up study (mean > 19 yr) of a group of 3,842 adult tuberculous patients admitted to two sanitoria from 1950 to 1957 (the years immediately before and after the introduction of isoniazid). Their mortality was compared with that expected during the same calendar period in a general population group with the same age and sex distribution. The relative risk of death (observed/expected number of deaths) from all malignant neoplasms in patients first starting chemotherapy in 1950-1952, before the general introduction of isoniazid, was 0.8 for those who received isoniazid at some time, compared with 0.5 for those who never received it; for those first starting chemotherapy in 1953-1957, after the general introduction of the drug, the respective risks were 1.4 and 1.8. The relative risk of death from malignant neoplasms was 2.1 in the first 4 yr after starting the treatment with isoniazid; this high relative risk was unlikely to be attributable to isoniazid and largely disappeared subsequently; in successive 4-yr periods it was 1.3, 0.9, 1.2, and 1.4. The relative risks of death from all malignant neoplasms for patients receiving a total dosage of less than 50, 50-99, 100-199, and 200 g or more were 1.5, 1.5, 1.0, and 1.3, respectively. For patients receiving a maximum daily dose of less than 250 g the relative risk was 1.3, and for those receiving 250 g or more it was 1.2. There was an unexplained difference in the mortality from malignant neoplasms in patients first starting chemotherapy in 1950-1952 (relative risk 0.6) and those first starting in 1953-1957 (relative risk 1.5). The results show no evidence of a carcinogenic effect of isoniazid in a period of followup averaging nearly 20 yr. (24 references)

6707 DIETHYLNITROSAMINE-INDUCED CHANGES IN MOUSE LIVER MORPHOLOGY AND FUNCTION. (Eng.) Gans, J. H. (Dept. Pharmacology, Coll. Medicine, Univ. Vermont, Burlington, VT 05401). *Proc Soc Exp Biol Med* 53(1): 116-120; 1976.

The effects of diethylnitrosamine (DEN) administration for 10-24 wk on the hepatic morphology of adult male Swiss mice were examined. Hexobarbital sleeping times were determined 10 and 24 wk after the start of the experiment. Mice were killed 3 days after hexobarbital sleeping times had been determined, and complete autopsies were performed. Additional mice were given CCl_4 in corn oil by gavage (0.5 µl/g body wt) 10 and 24 wk after the start of DEN treatment. The mice were observed for lethality and morbidity for 42 hr, and surviving mice were killed and autopsied. Administration of DEN up to 24 wk resulted in intense bile duct proliferation, formation of hepatic nodules (some of which appeared to be hyperplastic), and foci of lymphocytic infiltration. No hepatocellular carcinomas or well-defined hepatomas were found. The only tumors observed were one hemangioma and, in two sections, tissue suggestive of cholangiocarcinoma. Hexobarbital sleeping times were significantly increased in mice treated for 10 wk, an effect that was markedly enhanced in mice treated with DEN for 24 wk. CCl_4 administration resulted in the death of 6/14 control mice within 26 hr. Morbidity was observed in each of the remaining 8 mice and fatty liver was seen in all 14 mice. There were no deaths, morbidity, or fatty livers in any of the DEN-treated mice given CCl_4. The significant increase in hexobarbital sleeping times and resistance to the hepatotoxic effects of CCl_4 in DEN-treated mice indicated that long-term exposure to DEN results in

progressive inhibition of liver drug-metabolizing
nzyme systems. Phenobarbital administration concur-
ent with DEN prevented the increases seen in hexo-
rbital sleeping times but did not alter the morpho-
gical changes in the liver produced by DEN. (19
eferences)

08 CARCINOGENIC EFFECTS OF A SINGLE DOSE OF
DIETHYLNITROSAMINE IN THREE UNRELATED
RAINS OF MICE: GENETIC DEPENDENCE OF THE INDUCED
MOR TYPES AND INCIDENCE. (Eng.) Diwan, B. A. (Jack-
n Lab., Bar Harbor, ME 04609); Meier, H. *Cancer
tt* 1(5): 249-253; 1976.

e carcinogenicity of a single dose of diethyl-
trosamine (DEN) was studied in three inbred strains
mice. The most predominant effects were lung
lenomas, leukemia, and liver tumors. Mice of strain
R/J developed both leukemia and lung tumors, SWR/J
ce were most susceptible to lung tumor development,
d in C57BL/6J mice liver lesions (including liver
mors) occurred. The results show that the single
se produced a variety of tumors, but their occur-
nce varied according to the genotype or strain of
use. (8 references)

09 PROLIFERATION OF ENDOCRINE (APUD-TYPE)
CELLS DURING EARLY N-DIETHYLNITROSAMINE-
DUCED LUNG CARCINOGENESIS IN HAMSTERS. (Eng.)
znik-Schueller, H. (Abteilung fuer Experimentelle
thologie, Medizinische Hochschule Hannover 3000
nnover 61, Karl-Wiechert-Allee 9, West Germany).
ncer Lett 5(1): 255-258; 1976.

rly epithelial alterations in the bronchi of
rian golden hamsters after treatment with N-diethyl-
trosamine (DEN) were studied by electron microscopy.
rty male hamsters were injected sc with 178 mg/kg
ice weekly for life. Pronounced proliferation of
ine precursor uptake and decarboxylase activity
PUD-type) cells occurred in the segmental bronchi
d bronchioles. Since similar epithelial altera-
ons did not occur in previous experiments after
nzo(a)pyrene treatment, it is concluded that the
itial stages of lung carcinogenesis differ with
spect to the carcinogen administered. (7 references)

10 CARCINOGENESIS AND CELL PROLIFERATION IN
MOUSE LIVER WITH DIMETHYLNITROSAMINE.
ng.) Takayama, S. *In: Mouse Hepatic Neoplasia.
oceedings of a Workshop held at the H.T.S. Manage-
nt Centre, Lane End, High Wycombe, Great Britain,
-17 May 1974.* Butler, W. H.; Newberne, P. M., eds.
ew York: Elsevier Scientific Publishing Co.): pp.
-75; 1975.

e histogenesis of hemangiomas induced by dimethyl-
trosamine (DMN) in ICR mice and the formation of
-methylguanine in the nucleic acid of the liver,
ng, and kidney, were investigated. Male ICR mice
(8 wk old) were fed 50 ppm DMN in the diet and killed at various times from day 1 through the 35th week on the diet. One hour before killing each mouse was given 100 μCi ^{3}H-thymidine ip. Liver parenchymal cells, bile-duct cells, sinusoidal endothelial cells, cells of the blood vessel walls, and cells of connective tissue were submitted to autoradiographic observation. At least 5,000 nuclei were examined for each animal. In the second part of the study (to determine the incorporation of labeled DMN), the mice were given 10 ppm ^{3}H-DMN solution as drinking water, and killed at various times from 1-30 days, and the nuclear DNA and cytoplasmic RNA were isolated from the liver, lungs, and kidney. In the first experiment, mice killed at 20 wk had enlarged liver parenchymal cells. Sinusoidal cell proliferation was observed in animals killed in the 25th wk. In animals killed after 35 wk, hemangiomatous neoplasms were found that consisted of densely proliferating spindle cells with occasional arrangements forming cleftlike spaces. No metastases were seen. Throughout the experiment, autoradiographical observation revealed more labeled cells among the sinusoidal cells than in the liver parenchymal cells. In animals killed in the advanced stage, focal proliferation of the sinusoidal endothelial cells was found. In the second experiment, liver nucleic acids were preferentially labeled in the initial stages, while labeling of those of the lung and kidney gradually increased, reaching almost the same level as that of the liver nucleic acids after 30 days. However, methylation of the N-7 position of guanine in liver nucleic acids was consistently higher than that of either kidney or lung. It is concluded that hemangioma of the liver induced by DMN develops from the proliferation of sinusoidal endothelial cells and that there is no definite correlation between tumor incidence in liver, lung, and kidney and the amount of N^7-methylguanine formed. (20 references)

6711 REGENERATION OF THE GUINEA PIG PAROTID GLAND AFTER 4-HYDROXYAMINOQUINOLINE-1-OXIDE-INDUCED NECROSIS. (Eng.) Rao, M. S. (Northwestern Univ. Medical Sch., 303 East Chicago Ave., Chicago, IL 60611); Reddy, J. K. *Proc Soc Exp Biol Med* 153(1): 166-169; 1976.

The effects of 4-hydroxyaminoquinoline-1-oxide (4-HAQO), a presumed proximate carcinogen resulting from the metabolism of 4-nitroquinoline oxide, on the male guinea pig parotid gland were investigated. 4-HAQO was injected iv at 22 mg/kg body wt. Three to seven animals were sacrificed at 6-hr intervals from 24 to 108 hr after injection. The single injection induced severe necrosis of the acinar cells of the parotid gland between 24 and 48 hr that was followed by regeneration between 54 and 108 hr. ^{3}H-Thymidine autoradiographic studies revealed a labeling index of 15% cells in the parotid gland 72 hr after injection. A significant increase in the mitotic activity of the parotid acinar cells was also evident 72 and 78 hr after 4-HAQO administration. The acinar cell repair, as well as formation of the new acini, was complete at 108 hr. The increased ^{3}H-thymidine labeling of acinar cells, as well as the increased mitotic activity, indicates that normally nondividing tissue, in which mitoses are rare, can be stimulated to proliferate actively by experimental manipulation. This study demonstrates that 4-HAQO, a pancreaticotoxic agent and a potent carcinogen, also causes necrosis of the parotid acinar tissue, which is followed by regeneration and restitution. (14 references)

6712 ESTIMATION OF N-NITROSODIMETHYLAMINE LEVELS IN AMBIENT AIR BY CAPILLARY GAS-LIQUID CHROMATOGRAPHY/MASS SPECTROMETRY. (Eng.)

Pellizzari, E. D. (Chemistry and Life Sciences, P. O. Box 12194, Res. Triangle Inst., Research Triangle Park, NC 27709); Bunch, J. E.; Bursey, J. T.; Berkley, R. E.; Sawicki, E.; Krost, K. *Anal Lett* 9(6): 579-594; 1976.

N-Nitrosodimethylamine (DMN) levels in ambient air were determined for an area surrounding an industrial site in Baltimore, MD. Using a Tenax GC cartridge for concentrating DMN and glass capillary gas-liquid chromatography/mass spectrometry with single ion (m/e 74) monitoring, DMN was quantified. The limit of detection was around 0.3 ppt at 25 C. On the industrial site DMN levels reached 32,000 ng/m^3 (10.67 ppb) of ambient air. It is concluded that DMN formed from in situ reactions between dimethylamine and NOx was negligible in amount and that the DMN measured in ambient air originated from a point source. (10 references)

6713 IN VITRO DNA DAMAGE/ALKALINE ELUTION ASSAY FOR PREDICTING CARCINOGENIC POTENTIAL.

(Eng.) Swenberg, J. A. (Pathology and Toxicology Res. Unit, Upjohn Co., Kalamazo, MI 49001); Petzold, G. L.; Harbach, P. R. *Biochem Biophys Res Commun* 72(2): 732-738; 1976.

Various carcinogens and noncarcinogens were evaluated for their ability to induce chromosomal damage by an in vitro/alkaline elution assay employing Chinese hamster V79 cells with or without a liver microsomal activation system. Alkylating agents, polycyclic aromatic hydrocarbons, amines, and a variety of miscellaneous ϕ compounds were tested with this assay. Exposure of cells to N-methyl-N'-nitro-N-nitrosoguanidine, methylnitrosourea, ethylnitrosourea, methyl methanesulfonate, and ethyl methanesulfonate gave dose-related increases in the elution of (^{14}C)DNA. Polycyclic aromatic hydrocarbons did not cause increased elution of (^{14}C)DNA in the absence of the rat liver activation system but dose-related increases in DNA elution were detected when known carcinogens of this class were tested in the presence of the activation system. None of the ultimate carcinogens required metabolic activation to induce DNA damage. None of the noncarcinogens tested caused significant increases in the DNA elution rate. All of the ultimate carcinogens and most of the procarcinogens induced sufficient DNA damage to be detected by the alkaline elution assay. This increased elution was detected at times when the ATP levels of the treated cells were similar to those of control cells. It is concluded that the in vitro/alkaline elution assay represents a rapid, reproducible, and inexpensive technique for detecting compounds with potential carcinogenic or mutagenic activity. (8 references)

6714 DNA DAMAGE AND REPAIR IN INTACT ANIMALS. SINGLE-STRANDED REGIONS IN RAT LIVER DNA FOLLOWING ADMINISTRATION OF DIMETHYLNITROSAMINE.

(Eng.) Huang, P. H. (Sch. Pathology, Univ. New South Wales, Kensington, New South Wales 2033, Australia); Stewart, B. W. *Cancer Lett* 1(5): 263-268; 1976.

Rat liver DNA was labeled by administration of ^{3}H-thymidine to female Wistar rats following partial hepatectomy. After 2 wk, the rats were treated with dimethylnitrosamine (ip, 0.9% soln) and killed after 4 hr. DNA was isolated and fractionated by elution from benzoylated DEAE-cellulose with NaCl and caffeine solution. The caffeine-eluted fraction was increased by administration of dimethylnitrosamine. This increase was proportional to the dose of carcinogen injected and persisted for at least 24 hr after its administration. The results suggest that the DNA contains short single-stranded sections associated with much longer regions of native DNA. (16 references)

6715 MUTAGENESIS STUDIES ON CULTURED MAMMALIAN CELLS. THE SENSITIVITY OF THE ASPARAGINE-REQUIRING PHENOTYPE TO SEVERAL CHEMICAL AGENTS.

(Eng.) Morrow, J. (Dept. Biochemistry, Texas Tech Univ. Sch. Medicine, Lubbock, TX 79409); Prickett, M. S.; Fritz, S.; Vernick. D.; Deen, D. *Mutat Res* 34(3): 481-488; 1976.

The effect of three chemical agents on the mutation frequency from asparagine dependence to asparagine independence was studied in Jensen sarcoma cells. Ethylmethanesulfonate brought about a dramatic exponential increase in mutation frequency. N-methyl-N'-nitro-N-nitrosoguanidine gave only modest increases and quinacrine HCl did not change the mutation frequency. The results, compared with those obtained in other systems and with previous work on the effects of UV on mutation induction in the asparagine system, suggest that the basis of the asparagine requirement of mammalian cell lines resides in a specific genetic alteration in nuclear DNA that is corrected by the mutagenic action of the agents tested. (26 references)

6716 X-RAY CONFORMATION OF SOME ESTROGENS AND THEIR BINDING TO UTERINE RECEPTORS. (Eng.)

Hospital, M. (Laboratoire de Cristallographie- Universite de Bordeaux I, 33405-Talence, France); Buset a, B.; Courseille, C.; Precigoux, G. *J Steroid Chem* 6(3/4): 221-225; 1975.

The binding of different estrogens with the uterine cytosol receptor was studied at equilibrium. Estradiol, diethylstilbestrol (DES), and 6,7'-dimethyl-7-ethylstilbestrol exhibited the same coefficient of binding to uterine receptor sites. Dienestrol, dimethylstilbestrol, and cyclophenyl, in contrast, had a slightly weaker affinity. X-ray analysis of these molecules gave their precise conformations. Estradiol had one conformation regardless of its surroundings. DES had two conformations: one symmetrical DES 1 and the other asymmetrical DES 2. The latter had a more estradiollike shape than the former, and its hydrogen bonding had the same geometry as estradiol. Dienestrol and dimethylstilbestrol always resembled symmetrical DES structurally. Their affinity and other physical and biochemical characteristics indicated that this form, DES 2, was the active form of DES on receptor binding sites. It is suggested that the relatively high affinity of cyclophenyl can be explained by geometrically superposing estradiol and DES 2. The weak activity, in vivo, of cyclophenyl raises the possibility of a role played by each extremity of estradiol. (16 references)

6717 RELATIONSHIP BETWEEN NUCLEOLAR MICROSPHERULE FORMATION BY URETHAN AND INHIBITION OF RNA AND PROTEIN SYNTHESIS. (Eng.) Lombardi, L. (Div. Experimental Oncology A, Istituto Nazionale per lo Studio e la Cura dei Tumori, Via G. Venezian 1, 20133 Milan, Italy). *Cancer Res* 36(7): 2210-2215; 1976.

Liver tissues of suckling C3Hf mice were treated with urethan and cycloheximide and studied by electron microscopy and light microscope radioautography. At 4 and 12 hr after treatment with a single dose of urethan (1 mg/g ip), ^{3}H-uridine incorporation in hepatocyte nuclei was 38% and 9% lower than in controls and became 32% higher at 24 hr. Nucleolar microspherules occurred 1.5 and 4 hr after the treatment, increased considerably in number at 10 and 12 hr, and decreased at 24 hr. These results suggest an inverse relationship between RNA synthesis and formation of microspherules. Cycloheximide alone (3 mg/kg ip) produced microspherules, whereas in combination with a dose of 1 or 2 mg/g of urethan it partially prevented or potentiated, respectively, the microspherule production. (28 references)

6718 RESISTANCE OF ALKYLATED DNA TO DEGRADATION BY DEOXYRIBONUCLEASE II AT NEUTRAL AND ACID PH. (Eng.) O'Connor, P. J. (Paterson Labs., Christie Hosp. and Holt Radium Inst., Withington, Manchester M20 9BX, England); Salisbury, J. G.; Margison, G. P. *Chem Biol Interact* 14(3-4): 313-323; 1976.

The ability of pig spleen deoxyribounclease II (DNAse II) to degrade a calf thymus DNA substrate to acid-soluble nucleotides was inhibited by prior methylation of the DNA with dimethyl sulfate. At pH 5.6 the activity of DNAse II toward DNA with 50% of the guanine residues methylated at position N-7 was 34% of that toward unmethylated DNA over an incubation period of 20 min; with longer incubation periods of 1 and 2 hr, the degree of inhibition diminished and the activities were 49% and 71% respectively. Other types of DNAse (pancreatic DNAse 1, snake venom exonuclease, spleen exonuclease, and liver DNAse) were more able to degrade the methylated substrate, retaining 70%-95% of the activity toward unmethylated DNA under the conditions used. The extent of inhibition of DNAse II activity was linearly related to the amount of methylated products in the DNA, and quantitatively similar effects were found under both acid and neutral conditions. DNAse II produced 3'-phosphate termini under both acid and neutral conditions. Local denaturation of the methylated DNA may be partly responsible for the inhibitory effects, but it is likely that the methylated purines also play a more direct role. (25 references)

6719 INFLUENCE OF BASIC THERAPEUTIC DRUGS AND SYMPTOMATIC ANTIRHEUMATIC DRUGS ON ENZYMES OF DNA SYNTHESIS AND REPAIR. (Ger.) Klein, G. (Medizinische Universitaetsklink, Auenbruggerplatz 15, A-8036 Graz, Austria); Wottawa, A. *Acta Med Austriaca* 2(4): 153-156; 1976.

Investigation of DNA synthesis and repair is important for evaluating the mutagenic effects of drugs. The nonsteroidal antirheumatic drugs metiacinic acid, ketoprofene, and azapropazone do not show any effect on these mechanisms. Tolmetin and indometacine, however, inhibit DNA synthesis only, while naproxene, oxyphenylbutazone, and flufenamic acid inhibit both synthesis and repair. Gold does not influence synthesis or repair, and D-penicillamine inhibits DNA synthesis only. However, chloroquine and metabolized cyclophosphamide respectively impair both synthesis and repair. This effect may also result from azathioprine in high dosage. It is suggested that application of two repair inhibitors or of one DNA repair inhibitor and one directly mutagenic acting drug, e.g., cyclophosphamide, should be avoided. (11 references)

6720 EFFECT OF ESTROGEN ON GENE EXPRESSION IN THE CHICK OVIDUCT. EFFECT OF ESTROGEN ON THE SEQUENCE AND POPULATION COMPLEXITY OF CHICK OVIDUCT POLY(A)-CONTAINING RNA. (Eng.) Monahan, J. J. (Dept. Cell Biology, Baylor Coll. Medicine, Houston, TX 77025); Harris, S. E.; O'Malley, B. *J Biol Chem* 251(12): 3738-3748; 1976.

Total cellular RNA preparations were isolated from chicken oviducts at three stages: immature chicks chronically stimulated with estrogen; estrogen-stimulated chicks withdrawn from hormone for 12 days; and laying hens. Total cellular RNA containing 3'-poly(A) sequences [poly(A)-RNA] were isolated from these preparations using oligo(dT)-cellulose chromatography. The number average nucleotide length of the poly(A)-RNA preparations in each case was about 2,000 nucleotides. The number average nucleotide length of the poly(A) residues at the 3'-

terminal end of each RNA preparation was approximately 70 adenylate residues. Complementary DNA (cDNA) copies to each preparation of poly(A)-RNA were synthesized using avian myeloblastosis virus RNA-directed DNA polymerase. These cDNA-poly(A) preparations were utilized in DNA excess hybridization experiments to analyze the complexity of the DNA sequences from which these RNAs were transcribed. Approximately 22% of each of the total cellular poly(A)-RNA's were transcribed from repeated DNA sequences, and the remaining majority were transcribed from single-copy or unique-sequence DNA. The number of different poly(A)-RNA sequences per cell was estimated by analyzing the kinetics of hybridization of these cDNA-poly(A) preparations to total cellular poly(A)-RNA extracts under conditions of RNA excess. The results revealed that 41% of the poly(A)-RNA from laying hen oviducts consisted of three different sequences per cell, each of which was present in approximately 25,000 copies/cell. The remainder of the poly(A)-RNA in this tissue consisted of approximately 25,000 different sequences/-cell, present largely in only two or three copies per cell. A somewhat similar sequence complexity was found in oviduct cells from estrogen-stimulated chicks. There were approximately 20,000 different poly(A)-RNA sequences/cell, each represented in only one to two copies per cell. However, there were five sequences present, on the average, in a concentration of 5,600 copies/cell. The poly(A)-RNAs from hormone-withdrawn tissue, in contrast, had a lower sequence complexity. There were only approximately 10,000 different poly(A)-RNA sequences/cell, each present in about three copies per cell. The few sequences present in great abundance in hen and hormone-stimulated tissues were apparently absent in oviduct tissue from hormone-withdrawn chicks, suggesting that the intracellular concentrations of these high-frequency RNA sequences are dependent on estrogen. (54 references)

6721 DETECTION OF ESTROGENS IN THE BLOOD PLASMA OF CALVES BY MEANS OF OVINE UTERINE ESTROGEN RECEPTORS. (Ger.) Agthe, O. (Physiologisches Institut, Tieraerztliche Hochschule Hannover, Hannover, West Germany). *Arch Lebensmittelhyg* 27(4): 127-130; 1976.

Serum diethylstilbestrol (DES) and 17β-estradiol (ED) were assayed in two calves by determining the extent of binding on sheep uterus receptors. Single challenge doses of 50 mg DES or ED were given sc and plasma levels were determined at 24- and 48-hr intervals. During a 7-day period average estrogen concentrations of 1,200 and 700 pg/ml were found in the ED and the DES animal, respectively; the average concentration over a 2-wk period in a control animal was 33 picag/ml. Normal ED and DES levels were reached after 9 and 14 days, respectively, confirming the portal delay in DES excretion. (23 references)

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6783 EFFECTS OF OESTRADIOL-17β AND ICI 46,474 ON TOTAL AND ACCESSIBLE CYTOPLASMIC OESTRADIOL-17β RECEPTORS IN DIMETHYLBENZANTHRACENE-INDUCED RAT MAMMARY TUMOURS (Meeting Abstract). (Eng.) Nicholson, R. I. (Tenovus Inst. Cancer Res., Welsh Natl. Sch. Medicine, Heath, Cardiff, CF 4 4XX, Wales); Golder, M. P.; Davies, P.; Griffiths, K. *J Endocri* 69(3): 50P-51P; 1976.

6784 DMBA AND PROGESTERONE BINDING IN BREAST AND UTERUS (Meeting Abstract). (Eng.) Barlow, J. (Medical Res. Centre, Prince Henry's Hosp., Melbourne, 3004, Australia); Funder, J. W. *Clin Exp Pharmacol Physiol* 3(3): 268-269; 1976.

6785 MAMMARY NODULES IN DOGS RECEIVING DEPO-PROVERA AND PROGESTERONE: AN INTERIM PRO RESS REPORT (Meeting Abstract). (Eng.) Coleman, M. E. (Dawson Res. Corporation, Orlando, FL); Murchis T. E.; Frank, D. *Toxicol Appl Pharmacol* 37(1): 181 1976.

6786 SERUM 17β-ESTRADIOL AND ESTRONE LEVELS I POSTMENOPAUSAL WOMEN WITH AND WITHOUT ENDOMETRIAL CANCER. (Eng.) Judd, H. L. (Dept. Repr ductive Medicine, Sch. Medicine, Univ. California, San Diego, La Jolla, CA 92093); Lucas, W. E.; Yen, S. S. C. *J Clin Endocrinol Metab* 43(2): 272-278; 1976.

6787 THE FATE OF 17β-ESTRADIOL IN THE PLASMA PREMENOPAUSAL AND POSTMENOPAUSAL PATIENT WITH CANCER. (Eng.) Vaughn, C. B. (Dept. Oncology, Providence Hosp., Southfield, MI); Kolakowski, D.; Zylka, U.; Brooks, S. C. *J Clin Endocrinol Metab* 43(2): 387-393; 1976.

6788 STUDIES ON LOW-DOSE ORAL CONTRACEPTIVES: CERVICAL MUCUS AND PLASMA HORMONE CHANGE IN RELATION TO CIRCULATING D-NORGESTREL AND 17α-ETHYNYL ESTRADIOL CONCENTRATIONS. (Eng.) Elstein, (Dept. Human Reproduction and Obstetrics, Univ. Southampton, Southampton S01 6HU, England); Morris S. E.; Groom, G. V.; Jenner, D. A.; Scarisbrick, J J.; Cameron, E. H. D. *Fertil Steril* 27(8): 892-899 1976.

6789 SEVEN-YEAR PROGRESS REPORT ON LONG-TERM ORAL CONTRACEPTIVE STUDIES IN FEMALE DOG AND MONKEYS (Meeting Abstract). (Eng.) Wazeter, F. X. (International Res. Development Corporation, Mattawan, MI); Geil, R. G.; Cookson, K. M.; Berlin V. R.; Lamar, J. K. *Toxicol Appl Pharmacol* 37(1): 178; 1976.

6790 ENDOMETRIAL CARCINOMA AND OESTROGEN THE FOR BREAST CANCER (Letter to Editor). (Eng.) Corcoran, R. (St. Catherine's Hosp., Birke head, Merseyside L42 OLQ, England); Howard, R. *La* 1(7969): 1137-1138; 1976.

6791 THE EFFECT OF CYCLOPHOSPHAMIDE AND OTHER DRUGS ON THE INCIDENCE OF PULMONARY METASTASES IN MICE (Meeting Abstract). (Eng.) Carmel, R. J. (Dept. Radiology, Stanford Univ. Sch. Medicine, Stanford, CA 94305); Brown, J. M. *Radiat Res* 67(3): 642; 1976.

6792 IS METHOTREXATE MUTAGENIC? (Ger.) Zachariae, H. (Univ.-Hautklinik, Marselisborg Hosp., DK-8000 Aarhus, Denmark). *Hautarzt* 27(2): 90; 1976. (4 references)

See also:

- * (Rev): 6601, 6602, 6603, 6604, 6605, 6631, 6641, 6642, 6646, 6650, 6651, 6662
- * (Phys): 6818, 6820, 6821
- * (Viral): 6837, 6897, 6898
- * (Immun): 6924, 6939
- * (Path): 6962, 6976, 6990, 7006, 7007, 7019, 7031, 7035, 7047, 7079, 7086, 7092, 7093, 7094
- * (Epid-Biom): 7112, 7116, 7118, 7120, 7122, 7123, 7143, 7144, 7147, 7148, 7149, 7150

6793 RECOMBINATION OF UV-INDUCED PYRIMIDINE DIMERS IN HUMAN FIBROBLASTS. (Eng.) Waters, R. (Biology Div., Oak Ridge Natl. Lab., Oak Ridge, TN 37830); Regan, J. D. *Biochem Biophys Res Commun* 72(3): 803-807; 1976.

Experiments were undertaken using extracted DNA and a purified UV endonuclease to determine whether pyrimidine dimers could be found in the DNA of human fibroblasts synthesized after UV irradiation. Normal fibroblasts and xeroderma pigmentosum (XP) cells were prelabeled with ^{14}C-thymidine overnight and the medium was replaced with unlabeled medium 2 hr before UV irradiation. After irradiation, cells were labeled with ^{3}H-thymidine for 9 hr and chased with unlabeled medium for 14 hr. The DNA was extracted and a purified UV endonuclease used to determine the numbers of endonuclease-sensitive sites in both ^{14}C- and ^{3}H-labeled DNA. This UV endonuclease has a high specificity to pyrimidine dimers and, by crude assay, less than 10% activity on the DNA strand complementary to that containing the pyrimidine dimers. Five percent of the UV-endonuclease-sensitive sites originally induced could be found in the DNA synthesized after UV irradiation. Such sites were found in both normal excision-proficient fibroblasts and in those from XP patients, which lack the ability to excise UV-induced pyrimidine dimers. Since the mechanism responsible for this exchange operates in both normal and XP cells, it is independent of the incision step required for the excision repair of such dimers. (16 references)

6794 DEFECTIVE DNA REPAIR REPLICATION IN XERODERMA PIGMENTOSUM FIBROBLASTS AND DNA REPAIR OF SOMATIC CELL HYBRIDS AFTER UV IRRADIATION. (Eng.) Akiba, H. (Ohara General Hosp., Fukushima-shi, Japan); Kato, T.; Nakano, H.; Seiji, M. *Tohoku J Exp Med* 117(1):1-13; 1975.

Primary fibroblast cultures were obtained from nine patients with xeroderma pigmentosum of various clinical types. Repair replication of the UV-damaged DNA in fibroblasts was studied by ^{3}H-thymidine labeling and radioautography. A DNA repair replication was decreased in all xeroderma pigmentosum fibroblasts compared with cells from normal donors. The repair activities in cells from patients ranged from nearly 0% in two infant cases and one case of De Sanctis-Cacchione syndrome to approximately 100% in a moderate adult case. There was, however, no correlation between the level of repair replication and the severity of clinical symptoms. Two cases that showed a lack of repair DNA replication were infants, suggesting that these cases may eventually develop De Sanctis-Cacchione syndrome. Xeroderma pigmentosum cells were analyzed genetically with cell fusion methods, using irradiated HVJ virus to determine the type of the complementation group. XP-1, XP-4, and XP-9 were classified into group D; XP-2, XP-7, and XP-8 into group A; and XP-5 into group E. (22 references)

6795 SYNTHESIS OF NUCLEAR PROTEINS DURING DNA REPAIR SYNTHESIS IN HUMAN DIPLOID FIBROBLASTS DAMAGED WITH ULTRAVIOLET RADIATION OR N-ACETOXY-2-ACETYLAMINOFLUORENE. (Eng.) Stein, G. S. (Dept. Biochemistry, Univ. Florida, Gainesville, FL 32610); Park, W. D.; Stein, J. L.; Lieberman, M. W. *Proc Natl Acad Sci USA* 73(5): 1466-1470; 1976.

The accumulation of newly synthesized nuclear proteins into nuclei was studied during DNA repair synthesis in confluent WI-38 human diploid fibroblasts damaged with UV radiation or N-acetoxy-2-acetylaminofluorene. In contrast to a marked stimulation of DNA repair synthesis, stimulation of amin acid incorporation into histone polypeptides or int the various molecular wt classes of nonhistone nuclear proteins was not observed. These results suggest that detectable stimulation of newly synthe sized nuclear protein incorporation into nuclei doe not accompany DNA repair synthesis induced by UV radiation or a direct-acting chemical carcinogen. A least for repair, DNA synthesis may be uncoupled from histone synthesis. (41 references)

6796 COLONY-FORMING ABILITY OF ULTRAVIOLET-IRRADIATED XERODERMA PIGMENTOSUM FIBROBLASTS FROM DIFFERENT DNA REPAIR COMPLEMENTATION GROUPS. (Eng.) Kraemer, K. H. (Dermatology Branch, NCI, NIH, Bethesda, MD 20014); Andrews, A. D.; Barrett, S. F.; Robbins, J. H. *Biochim Biophys Acta* 442(2): 147-153; 1976.

Results are presented of colony-forming ability studies on xeroderma pigmentosum (XP) from three complementation groups. Patients with XP develop severe sunlight-induced damage, including malignan neoplasms, on sun-exposed skin. Some patients also have neurological abnormalities. XP cells are know to have impaired ability to repair ultraviolet lig or chemical mutagen-induced damage to their DNA, and cell-fusion studies have shown five complement tion groups among the DNA excision repair-deficien strains. All XP fibroblast strains tested had lowe colony-forming abilities after ultraviolet irradia tion than normal strains. Furthermore, it was foun that strains from different complementation groups can have different post-ultraviolet colony-forming abilities and that strains from patients with neur logical abnormalities are the most sensitive to ultraviolet light. These results suggest that extremely ineffective repair of damaged DNA in centr nervous system neurons may be the cause of the neu logical abnormalities. (19 references)

6797 LONG-TERM RETENTION OF AMERICIUM-241 FOL LOWING ACCIDENTAL INHALATION. (Eng.) Fry F. A. (Natl. Radiological Protection Board, Harwel Didcot, Oxfordshire OX11 ORQ, England). *Health Phy* 31(1): 13-20; 1976.

The distribution and retention of americium-241 were studied in two men for a period of almost 4 y following accidental inhalation of americium oxide over a 3-mo period. At the time of the first measu ment (5 and 8 mo after intake), approximately hal the total body content was located in the thorax; elimination from this region was slow, with a hal ife of at least 900 days. No information is avail- ble on the more rapid clearance processes that ould have occurred at an earlier stage. Results ndicate an increase in skeletal activity in one of he subjects between days 324 and 1,392: (a) the esponse of the detector viewing the knees increased y a factor of five; (b) activity in the ankles ncreased by a factor of 2.5, and that in the sacrum ncreased by 50%; and (c) the scans showed an in- rease of about 40% in the combined response of the eg, pelvis, and head sections. In this same subject, here was no evidence for any reduction in the liver urden either from the counting rates recorded by he collimated detectors or from the scan data. The low removal of activity from the liver and from the ody as a whole is not inconsistent with the recom- endations of a Task Group of the International ommittee on Radiation Protection, which proposed hat clearance half-lives of 40 yr (liver) and 100 r (whole body) be assumed. These data suggest that he liver may be as critical an organ as bone in the ormation of maximum permissible body burdens of mericium-241. (11 references)

798 THE PATHOLOGY OF AMERICIUM 241. (Eng.) Nilsson, A. (Res. Inst. Natl. Defence, -172 04 Sundbyberg, Sweden); Broome-Karlsson, A. *cta Radiol* [*Ther*] *(Stockh)* 15(1): 49-70; 1976.

ale CBA mice were injected ip with ^{241}Am citrate 16, 8, 0.4, 0.2, and 0.04 μCi/kg). The two highest oses were highly destructive of the hematopoietic issues, testes, and bone tissue. The highest fre- uency of induced tumors of the skeleton and hemato- oietic tissue occurred in the 8-μCi group. In the iver, adrenal glands, kidney, and heart, degenera- ive lesions were found mainly in the higher dose roups. In the lower dose groups degenerative le- ions appeared earlier and at a higher frequency an in the controls. (15 references)

99 PHYTOHEMAGGLUTININ AND LIPOPOLYSACCHARIDE RESPONSIVENESS OF SPLEEN CELLS FROM MICE POSED TO FRACTIONATED TOTAL-BODY X-IRRADIATION. ng.) Hori, Y. (Radiation Center of Osaka Prefecture, inke-cho, Sakai, Osaka, Japan); Nishikawa, R. *Annu p Radiat Cent Osaka Prefect* 16: 87-90; 1975.

e changes in the phytohemagglutinin (PHA) and popolysaccharide (LPS) responsiveness of spleen lls from NIH Swiss mice exposed to fractionated tal-body x-irradiation (170 R, at weekly intervals, r 4 doses) were studied. The functional activity B lymphocytes measured by responsiveness to LPS owed a decline to about 62% of nonirradiated con- ol values after the first 170-R exposure. Values turned rapidly during the second and the third posure and declined again after the third irradia- on. The phase of PHA-induced lymphocyte transforma- on (T cell response) during fractionated irradia- on was in direct antithesis to LPS response. It is ggested that B lymphocytes are more radiosensitive an T lymphocytes in mice and that the difference PHA and LPS responsiveness reflects the movements T and B lymphocytes in spleens from mice given four weekly whole-body x-irradiation exposures. (9 references)

6800 ESTIMATE OF NATURAL INTERNAL RADIATION DOSE TO MAN. (Eng.) Manocha, K. K. (Dept. Radiology, Medical Coll., Rohtak, India); Mohindra, R. K. *Health Phys* 30(6): 485-487; 1976.

An analytical approach was developed to evaluate the internal radiation dose to man due to natural, long-lived radioisotopes of elements involved in human metabolism. The relative abundance of various radioisotopes inside the body was taken from the existing established data for a standard man. The small contributions like K capture and internal conversion with x-rays and external and internal β-bremsstrahlung were considered, as well as, contributions due to atomic recoils after α emission. The total evaluated does of about 19 mrem/yr with about 20% variation is in fair agreement with earlier investigations. (10 references)

6801 THE DISTRIBUTION OF ABSORBED DOSE-RATES IN HUMANS FROM EXPOSURE TO ENVIRONMENTAL GAMMA RAYS. (Eng.) O'Brien, K. (Health and Safety Lab., US Energy Res. and Development Admin., New York, NY 10014); Sanna, R. *Health Phys* 30(1): 71-78; 1976.

The propagation of environmental gamma rays through the human body was calculated with the use of the three-dimensional Monte-Carlo code DISDOS. These calculations were performed to determine the gonadal dose with a statistical accuracy of 10% or less for each of the energies considered. The ratio of exposure to absorbed dose in the human body averages about 0.6. A mean annual gonadal dose produced by environmental gamma rays in the US was calculated to be 32% ± 4% mrads/yr. The mean annual dose to the red marrow was calculated to be 29% ± 0.1% mrads/yr. (19 references)

6802 PRELEUKEMIC STATES IN ATOMIC BOMB SURVIVORS IN JAPAN. (Eng.) Kamada, N. (Dept. Internal Medicine, Res. Inst. for Nuclear Medicine and Biology, Hiroshima Univ., Kasumi-cho, Hiroshima, Japan); Uchino, H. *Blood Cells* 2(1/2): 57-65; 1976.

Cytologic and cytogenetic studies were performed on the bone marrow cells of 6 atom bomb survivors who had prolonged periods of blood disorders terminating in acute leukemia (group I), 6 survivors with blood disorders but without leukemia (group II), and 85 survivors in apparent good health (group III). Of the patients in group I, who were examined at the preleukemic state, 5/6 had abnormal clones. In 4/6, morphologic abnormalities of bone marrow cells taken 3-10 yr before leukemic development included giant neutrophils or basophils and binucleated granulocytes or megakaryocytes. All patients in group II had stable types of chromosome aberrations. The types of cytologic abnormalities were similar to those in group I, but the frequencies were a little less than those in group I. In group III, 14 persons had stable types of chromosome aberrations that were accompanied by transient clone formation in 11 cases. Cytologic and clinical abnormalities were not observed in the group. The persistent and high percentages of cytologic and cytogenetic abnormalities in patients with prolonged periods of blood disorders, regardless of history of radiation exposure, suggest a preleukemic state, and they also give some clue to the problems of leukemogenesis. (7 references)

6803 TWO CASES OF SARCOMA DEVELOPING AT THE SITE OF FRACTURE AND METALLIC OSTEOSYNTHESIS. (Pol.) Witwicki, T. (Oddz. Chir. Urazowo-Ortop. Szpitala Bielanskiego, ul. Kredytowa 8 m 28, 00-062 Warsaw, Poland); Daniluk, A.; Dulowski, W. *Wiad Lek* 29(4):339-343: 1976.

The development of sarcoma is reported in two males, aged 24 and 50 yr, following femoral bone fracture and metallic osteosynthesis. The first patient was hit by a car and was treated with screw immobilization of the left femoral bone. Fibrosarcoma was found 5 mo later. The second patient had fractured the right femoral bone and had undergone screw immobilization 11 yr before referral for a tumor in the affected bone. Rhabdomyosarcoma was diagnosed following biopsy. In both cases, the development of sarcoma was associated with the significant trauma suffered by the subjects as well as with the implantation of metal.

6804 DEVELOPMENT OF PULMONARY METASTASES FROM A TRANSPLANTED MAMMARY CARCINOMA IN THE LEG. II. STUDIES OF A POSSIBLE 'FACTOR' RELEASED AS A RESULT OF THE IRRADIATION OF THE TUMOR-BEARING LIMB (Meeting Abstract). (Eng.) Dubravsky, N. (Univ. Texas System Cancer Center, M. D. Anderson Hosp. Tumor Inst., Houston, TX 77030); Hunter, N.; Mason, K.; Dubrawsky, C. *Radiat Res* 67(3): 642-643; 1976.

6805 DEVELOPMENT OF PULMONARY METASTASES FROM A TRANSPLANTED MAMMARY CARCINOMA IN THE LEG. I. EFFECT OF IRRADIATION OF THE PRIMARY TUMOR (Meeting Abstract). (Eng.) Hunter, N. (Univ. Texas System Cancer Center, M. D. Anderson Hosp. and Tumor Inst., Houston, TX 77030); Dubravsky, N.; Mason, K.; Withers, H. R. *Radiat Res* 67(3): 642; 1976.

6806 INCREASED SURVIVAL OF CELLS WITH HIGH CONCENTRATIONS OF INTRACELLULAR CYCLIC AMP. RELATIONSHIP TO PHASE OF CELL CYCLE (Meeting Abstract). (Eng.) Lehnert, S. (Dept. Therapeutic Radiology, McGill Univ., Montreal, Canada). *Radiat Res* 67(3):598-599; 1976.

6807 INFLUENCE OF DOSE RATE OF HIGH-ENERGY ELECTRONS ON CHROMOSOMAL ABERRATION YIELD IN EHRLICH TUMOR CELLS. (Ger.) Akimov, A.A. (N. N. Petrov Scientific Res. Inst. Oncology, Ministry Health USSR, 188646 Leningrad, Pesocny-2, Leningrad 68, USSR); Kozlov, A. P.; Makarevskii, M. F.; Pertsov, O. L. *Radiobiol Radiother (Berl)* 17(3): 415-421 1976.

6808 CHARACTERIZATION OF FAST SPLIT-DOSE REPAIR FOUND IN PLATEAU-PHASE MAMMALIAN CELLS (Meeting Abstract). (Eng.) Koch, C. J. (Ontario Cancer Treatment Res. Foundation, Victoria Hosp., London, Ontario N6A 4G5, Canada). *Radiat Res.* 67(3): 598; 1976.

6809 NEUTRON-INDUCED MAMMARY NEOPLASMA IN FIVE GENETIC STRAINS OF RATS (Meeting Abstract) (Eng.) Vogel, H. H. (Univ. Tennessee Center Health Sciences, Memphis, TN 38163). *Radiat Res* 67(3): 630; 1976.

6810 OBSERVATIONS ON LATE EFFECTS IN MICE EXPOSED TO 400 MeV NEUTRONS. (Eng.) Covelli, V. (Lab. Radiation Pathology, C.N.E.N., C.S.N. Casac cia, Casella Postale 2400, Rome, Italy); Di Paola, M.; Bassani, B.; Metalli, P. *Int J Radiat Biol* 29(5) 439-453; 1976.

6811 RADIATION-INDUCED DNA SINGLE-STRAND BREAK OF PRE-HEATED CULTURED MAMMALIAN CELLS IN N_2 AND N_2O SATURATED SUSPENSIONS (Meeting Abstract). (Eng.) Antoku, S. (Hiroshima Univ., Hiroshima, Japa *J Radiat Res* 17(1): 31-32; 1976.

6812 INVOLVEMENT OF SULFHYDRYL GROUPS IN THE ACTION OF INSULIN AND RADIATION ON THYMOCYTE NA-DEPENDENT AMINO ACID TRANSPORT. (Eng.) Kwoc L. (Div. Radiobiology, Tufts-New England Medical Center, 171 Harrison Ave., Boston, MA 02111); Walla D. F.; Hefter, K. *Biochim Biophys Acta* 419(1):93-10 1976.

6813 AGE-DEPENDENCE OF THE ONCOGENICITY OF IONIZING RADIATION IN RAT SKIN (Meeting Abstract). (Eng.) Vanderlaan, M. (NYU Medical Cente New York, NY 10016); Strickland, P.; Albert, R. E.; Burns, F. J. *Radiat Res* 67(3): 629; 1976.

6814 THE COMBINED EFFECT OF IONIZING RADIATIO AND ULTRAVIOLET LIGHT ON TUMOR INDUCTION IN RAT SKIN (Meeting Abstract). (Eng.) Burns, F. J. (NYU Medical Center, New York, NY 10016); Stricklan P.; Vanderlaan, M.; Albert, R. E. *Radiat Res* 67(3): 629; 1976.

6815 GENETIC EXCHANGES CAUSED BY ULTRAVIOLET PHOTOPRODUCTS IN PHAGE λ DNA MOLECULES: THE ROLE OF DNA REPLICATION. (Eng.) Lin, P.-F. (Dep Molecular Biophysics and Biochemistry, Yale Univ. Sch. Medicine, New Haven, CT 06520); Howard-Flander P. *Mol Gen Genet* 146(2): 107-115; 1976.

6816 THE DISTRIBUTION, RETENTION AND CYTOGENETIC EFFECTS OF INJECTED ^{147}Pm CITRATE OR ^{147}Pm IN FUSED ALUMINOSILICATE PARTICLES IN THE CHINESE HAMSTER (Meeting Abstract). (Eng.) Brooks, A. L. (Lovelace Foundation, Albuquerque, NM 87115); Goldman, M. *Radiat Res* 67(3): 626; 1976.

6817 RADIATION DAMAGE TO MOUSE SPERMATOGONIA FROM ^{99m}TC PERTECHNETATE (Meeting Abstract). (Eng.) Meistrich, M. L. (M. D. Anderson Hosp. and Tumor Inst., Houston, TX); Mian, T. A.; Suzuki, N.; Haynie, T. P. *Radiat Res* 67(3): 624; 1976.

818 IODINE-125 LABELED IODODEOXYURIDINE: PROTOTYPE FOR SELECTIVE SUBCELLULAR RADIATION THERAPY (Meeting Abstract). (Eng.) Bloomer, W. D. (Dept. Radiation Therapy, Harvard Medical Sch., oston, MA 02115); Adelstein, S. J. *Radiat Res* 67(3): 33; 1976.

819 RADIATION INDUCED DIVISION DELAY: ELUCIDATION OF THE PRIMARY TARGET SITE (Meeting bstract). (Eng.) Warters, R. L. (Inst. Molecular iophysics, Florida State Univ., Tallahassee, FL 2306); Hofer, K. G. *Radiat Res* 67(3): 631-632; 976.

820 X-RAY INDUCED MITOTIC DELAY IN CHO CELLS: A COMMON EFFECT FOR ACTINOMYCIN D, CAF-EINE, AND CORDYCEPIN (Meeting Abstract). (Eng.) omasovic, S. P. (Dept. Radiology and Radiation iology, Colorado State Univ., Fort Collins, CO 0523); Dewey, W. C. *Radiat Res* 67(3): 631; 1976.

821 ANALYSIS OF DIVISION DELAYS AFTER LOW X-RAY DOSES WITH AND WITHOUT CYCLOHEXIMIDE RESENT (Meeting Abstract). (Eng.) Roesch, W. C. Battelle, Pacific Northwest Lab., Richland, WA 9352); Braby, L. A.; Schneiderman, M. H. *Radiat Res* 7(3): 631; 1976.

822 LATE SOMATIC EFFECTS IN SYNGENEIC RADIATION CHIMAERAS. III. OBSERVATIONS ON ANI-ALS REPOPULATED WITH IRRADIATED MARROW. (Eng.) etalli, P. (Lab. Radiation Pathology, C.N.E.N., C.S.N. Casaccia, Casella Postale 2400, Rome, Italy); Silini, G.; Covelli, V.; Bassani, B. *Int J Radiat Biol* 29(5): 413-432; 1976.

6823 DIVERGENT X-RAY-INDUCED MUTATION RATES IN THE MOUSE FOR H AND ''7-LOCUS'' GROUPS OF LOCI. (Eng.) Kohn, H. I. (Center for Human Genetics and Dept. Radiation Therapy, Harvard Medical Sch., Boston, MA 02115); Melvold, R. W. *Nature* 259(5540): 209-210; 1976. (7 references)

6824 PATTERNS OF INDUCED ABERRATIONS IN HUMANS WITH ABNORMAL AUTOSOME COMPLEMENTS. (Eng.) Seabright, M. *In: Chromosomes Today*. Pearson, P. L.; Lewis, K. R., eds. (New York: John Wiley & Sons): vol. 5, Proceedings of the Leiden Chromosome Conference, July 15-17, 1974, pp. 293-298; 1976.

6825 CHILDHOOD CANCER AND FETAL X-RAY EXPOSURE IN CHILDREN BORN IN MILITARY HOSPITALS (Meeting Abstract). (Eng.) Robinette, C. D. (Natl. Res. Council, Washington, DC); Jablon, S. *Radiat Res* 67(3): 627; 1976.

6826 TWO CASES OF ACUTE MYELOID LEUKEMIA AFTER THOROTRAST INCORPORATION (Meeting Abstract). (Ger.) Mobius, W. (Medizinische Universitatsklinik, Freiburg, West Germany); Hennekeuser, H. H.; Fabricius, H. A.; Heni, N.; Henrichs, H.; Riese, U. M.; Stang-Voss, C.; Lohr, G. W. *Blut* 33(3): 208-209; 1976. (No references)

6827 SIGNIFICANCE OF THE SIZE OF RESPIRABLE FIBERS FOR THEIR CARCINOGENIC EFFECT (Meeting Abstract). (Ger.) Pott, F. (No affiliation given). *Lufthyg Silikoseforsch* 8: 215; 1975. (No references)

See also:

* (Rev): 6606, 6613, 6634, 6636, 6639, 6643, 6644
* (Chem): 6776, 6778
* (Viral): 6839, 6840, 6842, 6896
* (Immun): 6929, 6936
* (Path): 7019, 7021, 7050
* (Epid-Biom): 7114, 7119, 7121, 7139

6828 EVIDENCE FOR TANDEM INTEGRATION OF AVIAN MYELOBLASTOSIS VIRUS DNA WITH ENDOGENOUS PROVIRUS IN LEUKEMIC CHICKEN CELLS. (Eng.) Shoyab, M. (Dept. Microbiology and Immunology, Univ. California at Los Angeles Sch. Medicine, Los Angeles, CA 90024); Dastoor, M. N.; Baluda, M. A. *Proc Natl Acad Sci USA* 73(5): 1749-1753; 1976.

The integration site of avian myeloblastosis virus (AMV) proviral DNA in DNA from leukemic chicken myeloblasts was studied by three sequential nucleic acid hybridizations. Large denatured cellular DNA fragments (2.1 x 10^6 daltons) were reassociated and fractionated according to sequence reiteration frequency. Next, the DNA remaining single-stranded in each fraction was immobilized on nitrocellulose filters and hybridized with an excess of unlabeled 70S RNA from Rous-associated virus-0 to saturate the endogenous proviral DNA sequences. Finally, the filter-immobilized DNA was hybridized with ^{3}H-35S RNA from AMV to quantitate the AMV-specific DNA in each fraction. The AMV provirus in AMV-induced leukemic myeloblasts appeared to be integrated in tandem with the endogenous proviral DNA and with contiguous cellular sequences that repeat approx 1,200 times per haploid cell genome. Each provirus integration unit in single-stranded leukemic cell DNA was equivalent to two 35S viral RNA subunits (total 6 x 10^6 daltons). It is suggested that the integration of AMV provirus is site-specific and occurs at a restricted number of sites (one to two per chicken cell haploid genome). (37 references)

6829 OBSERVATIONS ON TEMPLATE-SPECIFIC CONDITIONS FOR DNA SYNTHESIS BY AVIAN MYELOBLASTOSIS VIRUS DNA POLYMERASE. (Eng.) Marcus, S. L. (Memorial Sloan-Kettering Cancer Center, 1275 York Ave., New York, NY 10021); Modak, M. J. *Nucleic Acids Res* 3(6): 1473-1486; 1976.

The effects of Mg^{++}, Mn^{++}, and KCl addition, individually and in combination, on the rate of DNA- and RNA-primed DNA synthesis by avian myeloblastosis virus DNA polymerase were studied with a variety of natural and synthetic template-primer combinations. Optimal divalent cation concentrations varied by as much as 10 times depending upon the template-primer used to direct synthesis. Addition of KCl to reaction mixtures containing optimal divalent cation concentrations produced stimulation or inhibition of DNA synthesis that was also template-specific. DNA synthesis on the modified template poly(2'-O-methylcytidylate) was uniquely stimulated by combinations of divalent cations. With Mg^{++} as divalent cation, deviations from classical Michaelis-Menten kinetics of substrate saturation occurred with all template-primers tested. (26 references)

6830 EVIDENCE FOR THE MULTIPLE ONCOGENIC POTENTIAL OF CLONED LEUKEMIA VIRUS: IN VITRO AND IN VIVO STUDIES WITH AVIAN ERYTHROBLASTOSIS VIRUS. (Eng.) Graf, T. (Max-Planck-Institut fuer Virusforschung, Tubingen, West Germany); Royer-Pokora, B; Schubert, G. E.; Beug, H. *Virology* 71(2): 423-433; 1976.

The in vitro and in vivo transforming properties of both the AEV-ES4 and AEV-R strains of avian erythroblastosis virus (AEV) were studied following clone purification of their constituent viruses. Both strains consisted of a defective transforming virus and a helper virus in excess. Helper viruses of each strain were clone-purified by isolating the virus from a single plaque. Pseudotypes of AEV, consisting of cloned AEV and cloned helper virus, were rescued after helper virus superinfection of nonproducer fibroblasts transformed by infection with only the transforming virus. These pseudotypes transformed erythroblasts as well as fibroblasts in in vitro assays. Injection of AEV-transformed nonproducer fibroblasts into 1-wk old chicks led to the formati of fibrosarcomas. Erythroblastosis was obtained after the inoculation of all AEV-pseudotypes tested. The helper viruses naturally associated with AEV-R and AEV-ES4 did not transform cultured cells but induced a slight cytopathic effect. In vivo studies demonstrated that they cause anemia and that they are probably responsible for the anemia-inducing capacity of AEV stocks. (16 references)

6831 GROWTH STIMULATION OF CHICK EMBRYO NEURORETINAL CELLS INFECTED WITH ROUS SARCOMA VIRUS: RELATIONSHIP TO VIRAL REPLICATION AND MORPHOLOGICAL TRANSFORMATION. (Eng.) Calothy, G. (Fondation Curie-Institut du Radium, Bat. 110, 91405, Orsay, France); Pessac, B. *Virology* 71(1): 336-345; 1976.

The relationship of induction of cell multiplicatio to viral replication and morphological transformati was analyzed by infection of 7-day-old chick embryo neuroretinal (NR) cells with conditional and noncon ditional transformation-defective viruses. NR cells infected with a temperature-sensitive mutant of Rou sarcoma virus (RSV) defective for cell transformation, but not for virus replication, were induced t multiply at both nonpermissive and permissive temperatures, although expression of the transformed phenotype, as tested by several parameters, was suppressed in these cells at nonpermissive temperature. Nonconditional, nontransforming viruses replicated normally in NR cells, but failed to induce their multiplication. These results indicate that only transforming viruses can induce NR cell multiplication and that viral replication alone does no account for the growth changes in infected NR cell These data also suggest that expressions of the transformed phenotype and induction of NR cell proliferation may depend on distinct viral informatio

6832 TEMPORAL ANALYSIS OF CELLULAR CYTOTOXICI AND HUMORAL FACTORS DURING PROGRESSION A REGRESSION OF ROUS SARCOMAS IN JAPANESE QUAILS. (Eng.) Hayami, M. (Dept. Measles Virus, Natl. Inst Health, Musashi-Murayama, Tokyo 190-12, Japan); It M.; Yoshikawa, Y.; Yamanouchi, K. *Jpn J Med Sci Bi* 29(1): 11-24; 1976.

The temporal appearance of cellular cytotoxicity and humoral activities (including blocking and arm ing) during Rous sarcoma development in Japanese

ails was examined by microcytotoxicity assay.
imals bearing regressing tumors induced by a moder-
e dose of virus (regressors) were compared with
imals bearing growing tumors induced by a large
se of virus (progressors). Cellular cytotoxicity
the spleen cells in regressors was detected in a
phasic pattern; a first phase as early as 3-5 days
stinoculation (pi), followed by an eclipse period
tween 7-10 days pi (time of active tumor growth),
d a second phase 12 days pi when the tumor had
tained maximum size. In progressors, only the
rst phase occurred. Instead, there was a stimula-
ry effect of the spleen cells on the growth of
rget cells. Arming activity, which conferred cyto-
ic activity on the normal spleen cells, was demon-
rated in the sera of regressors in a similar bi-
asic pattern. The early activity was present 3
ys pi and the late one 19 days pi. The former was
ected by preincubation of serum with effector
lls in the microcytotoxicity assay and the latter
preincubation with target cells. In progressors,
ly the early arming activity that reacts with
fector cells was demonstrated. Blocking activity,
ch abrogates cellular cytotoxicity, was demon-
rated in both regressors and progressors, but
ocking activity in regressors was only transiently
monstrated and only by preincubation with effector
ls at the time of maximum tumor growth. The ac-
ity in progressors, however, seemed to persist
er the tumor reached maximum size. Since the
lier activity was effective at the effector cell
el and the later one at both the effector and
rget cell levels, participation of blocking fac-
s of different types in progressors was also
gested. (120 references)

3 INHIBITION OF AVIAN SARCOMA VIRUS REPLICATION BY GLUCOSAMINE: A SPECIFIC EFFECT ON SYNTHESIS AND PROCESSING OF VIRAL PROTEINS.

g.) Hayman, M. J. (Dept. Microbiology, Sch. Med-
ne, Univ. Southern California, 2025 Zonal Ave.,
Angeles, CA 90033); Hunter, E.; Vogt, P. K.
ology 71(2): 402-411; 1976.

mechanism of inhibition of virion synthesis
er treatment of avian RNA tumor virus-infected
cken fibroblasts with 20 mM glucosamine for 8
was studied. A kinetic analysis revealed that the
ect of glucosamine was essentially complete 5 hr
er its addition, when virion production had been
ibited fiftyfold. By 5 hr, cellular protein syn-
sis was inhibited 60% and virus protein synthesis
specifically inhibited by a further 75%. The
r nonglycosylated viral structural proteins
, p19, p15, and p12) are synthesized as a 76,000-
on precursor (Pr76) that is subsequently cleaved
he virion proteins. The effects of glucosamine
roduction of the major nonglycosylated viral
ctural proteins were examined by pulse-chase
riments. After 5 hr of treatment with glucosamine
5% of the precursor synthesized in a 15-min
e was cleaved in an hour, compared with 54% in
eated cells. Chases in the absence of glucosamine
nstrated that the precursor synthesized in the
ence of glucosamine could be cleaved and as-
led into virions. Sodium dodecyl sulfate-polyacrylamide gel electrophoresis of these virions showed that they lacked radioactively labeled glycoproteins gp85 and gp37. Thus, glucosamine inhibits the replication of avian RNA tumor viruses by a combination of an inhibition of cellular protein synthesis, viral structural protein synthesis, and Pr76 cleavage. (22 references)

6834 MACROMOLECULAR SYNTHESIS IN CELLS INFECTED WITH FROG VIRUS 3. V. THE ABSENCE OF POLYADENYLIC ACID IN THE MAJORITY OF FROG VIRUS 3-SPECIFIC mRNA SPECIES.

(Eng.) Willis, D. B. (Lab. Virology, St. Jude Children's Res. Hosp., P.O. Box 318, Memphis, TN 38101); Granoff, A. *Virology* 73(2): 543-547; 1976.

Attempts were made to isolate the polyadenylic acid (poly(A))-containing messenger RNA (mRNA) from frog virus 3 (FV 3)-infected BHK-21 cells by binding to oligo(dT)cellulose. Vaccinia virus-infected BHK-21 cells were used as controls. Most FV 3-specific mRNA did not contain poly (A) tracts of sufficient length to be detected by binding to oligo(dT)cellulose. Although 32% of the uninfected cell RNA (pulse-labeled at 30 C) and at much at 62% of vaccinia virus-infected cell RNA bound to oligo(dT)cellulose, only 14% of labeled RNA extracted from FV 3-specific infected cells bound to the oligo(dT) column. This suggests that very few, if any, of the FV 3-specific mRNA contained poly(A) tracts longer than 15 residues, the minimum length for oligo(dT) binding. Of the 14% of labeled RNA from FV 3-infected cells that bound to the oligo(dT) column, 40%-55% were ribonuclease-resistant and sedimented at 6S. In contrast, of the 62% of labeled RNA isolated from vaccinia virus-infected cells that bound to oligo(dT), 16.2% were in a ribonuclease-resistant form and were representative of the whole spectrum of vaccinia virus RNA size classes. Three possible explanations are suggested for these findings, the most plausible of which is that the majority of FV 3 mRNAs never contain poly(A). The poly(A)-containing molecules could belong to a special minor class of messengers or have no messenger activity at all. (21 references)

6835 HOST RESTRICTION OF FRIEND LEUKEMIA VIRUS: SYNTHESIS AND INTEGRATION OF THE PROVIRUS.

(Eng.) Sveda, M. M. (Dept. Medicine, Albert Einstein Coll. Medicine, Bronx, NY 10461); Soeiro, R. *Proc Natl Acad Sci USA* 73(7): 2356-2360; 1976.

The mechanism of host restriction of exogenous infection by murine leukemia viruses was investigated by comparing the early events in the replication of N-tropic versus B-tropic Friend leukemia virus in NIH 3T3 cells, which are Fv-1nn in type, permissive for the N-tropic strain and nonpermissive for the B-tropic strain. The synthesis, intracellular location, and molecular form of virus-specific DNA early in replication were studied by molecular hybridization with a virus-specific DNA probe. The results suggested that in the permissive infection viral DNA rapidly becomes integrated with cellular DNA. However, in the nonpermissive infection, although almost equal amounts of both positive and negative strand viral DNA are synthesized, the provirus is not integrated. (32 references)

6836 PURINE AND PHOSPHORIBOSYLPYROPHOSPHATE SYNTHESIS IN DIFFERENTIATING MURINE VIRUS-INDUCED ERYTHROLEUKEMIC CELLS IN VITRO.

(Eng.) Reem, G. H. (Dept. Pharmacology, New York Univ. Sch. Medicine, New York, NY 10016); Friend, C. *J Cell Physiol* 88(2): 193-196; 1976.

Phosphoribosylpyrophosphate synthetase activity was determined in Friend virus-induced erythroleukemic cells in culture that were stimulated to differentiate in the presence of dimethylsulfoxide. The activity did not decrease in cells that had acquired the specialized function of hemoglobin synthesis, nor was the phosphoribosylpyrophosphate content of untreated erythroleukemic cells significantly different from that of cultures exposed to dimethylsulfoxide for 96 hr. However, the rate of the early steps of de novo purine biosynthesis measured by the incorporation of 1-^{14}C-glycine and 1-^{14}C-formate into formylglycinamide ribonucleotide, was significantly lower in differentiating cell cultures. The addition of glutamine or ammonia increased glycine incorporation in control cultures, but not in treated cultures. In the normal development of RBC in vivo, phosphoribosylpyrophosphate synthetase activity was preserved, but the capacity to synthesize purines de novo was lost, as was the activity of the phosphoribosyl-1-amine synthesizing enzymes. The results suggest that the de novo purine biosynthesis rate in this erythroleukemic cell line is not limited by the availability of phosphoribosylpyrophosphate, but rather by a decrease in the phosphoribosyl-1-amine synthesizing enzymes. These findings provide further evidence that during dimethylsulfoxide-stimulated erythroid maturation, the same regulatory mechanisms are operative as in normal cellular development and that ammonia-dependent purine biosynthesis is subject to the same regulatory mechanisms as glutamine-dependent biosynthesis. (12 references)

6837 THE DEPENDENCE OF ERYTHROID DIFFERENTIATION ON CELL REPLICATION IN DIMETHYL SULFOXIDE-TREATED FRIEND LEUKEMIA-VIRUS-INFECTED CELLS.

(Eng.) Wiens, A. W. (Biology Dept., Kalamazoo Coll., Kalamazoo, MI); McClintock, P. R.; Papaconstantinou, J. *Biochem Biophys Res Commun* 70(3): 824-831; 1976.

The relationship between cell replication and erythroid differentiation in dimethylsulfoxide (Me_2SO)-treated Friend leukemia virus-infected spleen cells from DBA/2J mice was studied using proflavine and thymidine. Varying concentrations of proflavine increased the generation time of these cells from 24 to over 50 hr, and in each case the induction of hemoglobin synthesis followed the completion of two cell doublings. Once the induction was initiated, the rate of hemoglobin accumulation was not affected by proflavine. Proflavine therefore did not affect the transcription or translation of globin mRNA, and the delay in induction of hemoglobin synthesis was due to its effect on cellular replication. Inhibition of cellular replication by high concentrations of thymidine had no effect on hemoglobin accumulation unless the cells were blocked within 36 hr after Me_2SO addition. If the cells completed two generations in the presence of Me_2SO, there was no effect upon their ability to synthesize hemoglobin even though growth was arrested. Thus, the inhibition of hemoglobin synthesis by proflavine was not merely the result of a toxic effect on newly subcultured cells but was due to its effect on cellular replication. The results confirm that, after addition of Me_2SO, Friend leukemia cells require more than one complete cell cycle to synthesize hemoglobin (23 references)

6838 RELATIONSHIP BETWEEN EXPRESSION OF ENDOGENOUS MURINE LEUKEMIA VIRUS AND DEVELOPMENT OF SPONTANEOUS LEUKEMIA IN RF MICE.

(Eng.) Okumoto, M. (Radiation Center of Osaka Prefecture, Shinke-cho, Sakai, Osaka, Japan); Takamori, Y.; Iwai, Y.; Iwai, M. *Annu Rep Radiat Cent Osaka Prefect* 16: 73-77; 1975.

The time course of induction of endogenous murine leukemia virus (MuLV) in the spleen and the general organ distribution of the virus were studied in RF mice. At the eighth day after infection all mice tested became virus-positive. Thereafter, the virus titer increased rapidly and reached a maximum level 5-6 wk after birth, after which it decreased slightl with age. In 3-mo-old female mice, virus titers were the highest in the uterus and ovaries and slightly lower in the marrow of the femur, spleen, and lymph nodes. The titers in the thymus and serum were the lowest. In 2-mo-old male mice, titers in various tissues were comparable to those in females of same age. The testis showed the lowest titer among tissue (18 references)

6839 THE ROLE OF LYMPHOID AND HAEMATOPOIETIC TARGET CELLS IN VIRAL LYMPHOMAGENESIS OF C57BL/KA MICE. II. NEOPLASTIC TRANSFORMATION OF BONE MARROW-DERIVED CELLS IN THE THYMIC MICROENVIRONMENT.

(Eng.) Kaplan, H. S. (Cancer Biology Res. Lab., Dept. Radiology, Stanford Univ. Sch. Medicine, Stanford, CA 94305); Lieberman, M. *Blood Cells* 2(1/2): 301-317; 1976.

The comparative susceptibility of C57BL/Ka mouse thymus, bone marrow, spleen, lymph node, and fetal liver cells to the lymphoma-inducing action of the radiation leukemia virus (RadLV) was studied. Hybri mice from reciprocal crosses between these and BALB mice were also used. Although replication of the virus was strongly thymotropic, cells of fetal live and of the bone marrow spleen of weanling mice were also susceptible to neoplastic transformation by th virus. The subpopulation of bone marrow cells susce tible to neoplastic transformation in vivo after infection with RadLV in vitro was relatively abundant. The susceptibility of these cells was relative age-independent, whereas that of thymocytes decline rapidly during the first few weeks of life. A remar able feature of this lymphoid tumor induction syste was that the thymic microenvironment was essential during the interval of several weeks required for

eoplastic transformation to occur in susceptible,
irus-infected target cells. (14 references)

840 THE ROLE OF LYMPHOID AND HAEMATOPOIETIC TARGET CELLS IN VIRAL LYMPHOMAGENESIS

F C57BL/KA MICE. I. SUSCEPTIBILITY TO VIRAL REP-
ICATION. (Eng.) Lieberman, M. (Cancer Biology
s. Lab., Dept. Radiology, Stanford Univ. Sch.
dicine, Stanford, CA 94305); Kaplan, H. S. *Blood*
lls 2(1/2): 291-299; 1976.

e influence of several parameters on the capacity
C57BL/Ka mouse hematopoietic cells to support
plication of the radiation leukemia virus (RadLV)
s studied. Although virus replication was strongly
ymotropic, the bone marrow and spleen were also
sceptible when infection was initiated at birth
ther than in adult life. Irradiation transiently
stores the susceptibility of adults almost to the
onatal level. Neonatal thymectomy did not diminish
e capacity of marrow cells to support virus rep-
cation, indicating that the migration of infected
ymus cells back to the marrow was not responsible
r the observed effect. Bone marrow cells in which
ral antigens were no longer detectable yielded
fectious virus after intrathymic inoculation,
ggesting the existence of a cryptic state of virus
fection. (17 references)

41 EXPRESSION OF MURINE ONCORNAVIRUS PROTEINS IN SYNCHRONIZED CELLS.

(Eng.) Schauf, V.
ept. Pediatrics, Abraham Lincoln Sch. Medicine,
iv. Illinois, Chicago, IL 60612); Panem, S. *Virol-*
y 71(2): 619-623; 1976.

rmal rat kidney (NRK) cells between the 32nd and
th passages and NRK cells transformed by Kirsten
rine sarcoma-leukemia virus (NRK-K) were synchron-
ed by double thymidine block. The cells were ex-
ined by indirect cytoplasmic immunofluorescence
ring synchronous growth for the presence of the
,000-, 12,000-, and 30,000-dalton internal virion
oteins (p10, p12, and p30) and for the 71,000-dal-
n major viral glycoprotein (gp71) using monospecific
tisera to p10, p12, p30, and gp71 proteins of
iend murine leukemia virus. Expression of p30 and
71 was increased during the late S + G_2 phase and
s decreased during the M and G_1 phases of the cell
cle in NRK-K cells. Expression of p30 was similarly
ordinated to the cell cycle in NRK cells. A pat-
rned expression of p10 and p12 was not detected.
e similarity between p30 expression in NRK and
-K cells indicates that controls of viral protein
pression may be similar in latent and productive
fection. (19 references)

2 THE ENHANCING EFFECT OF FRACTIONATED WHOLE-BODY X-IRRADIATION ON REPLICATION OF ENDOG-

US LEUKEMIA VIRUSES IN BALB/C MICE. (Eng.) Taka-
i, Y. (Radiation Center of Osaka Prefecture,
nke-cho, Sakai, Osaka, Japan); Okumoto, M.; Iwai,
Iwai, Y. *Annu Rep Radiat Cent Osaka Prefect* 16:
82; 1975.

incidence of leukemia, changes in the tissue wt of spleen and thymus, and the expression of endogenous viruses were examined with BALB/c mice following four weekly fractionated whole-body x-irradiations of 170 R each, starting at 4 wk of age. The incidence of leukemia was low for the unirradiated controls (2 of 30 females and 0 of 28 males), but 60% of the irradiated male mice developed thymic lymphoma. The virus-positive cells appeared earlier in the spleen than in the thymus and bone marrow and increased with aging. The time of the appearance of virus-positive cells in these tissues was accelerated markedly by fractionated x-irradiation, as was the frequency of virus expression. (16 references)

6843 SPONTANEOUS AUTOIMMUNIZATION OF GIX CELL SURFACE ANTIGEN IN HYBRID MICE.

(Eng.) Obata, Y. (Memorial Sloan-Kettering Cancer Center, New York, NY 10021); Stockert, E.; Boyse, E. A.; Tung, J.-S.; Litman, G. W. *J Exp Med* 144(2): 533-542; 1976.

The GIX antigen expressed on the thymocytes of GIX + mice is a type-specific constituent of glycoprotein gp70, which forms the major envelope component of murine leukemia virus. Previous attempts to induce GIX antibody in mice have failed. The hybrid mouse (B6-GIX+x 129-GIX-)F_1 has been found to produce substantial amounts of GIX antibody spontaneously, presumably of the IgM class and appearing as early as 2 mo of age. The specificity of GIX natural mouse antibody is the same as that recognized by the conventional GIX typing serum produced in rats. To explain the nonresponder status of the parental B6+ and 129 stocks, two dominant *Ir* loci are postulated, affecting B and T cells, respectively, or two functionally different T cell subclasses. Both would be required for the GIX responder phenotype, and each parent would contribute one of the two genes to the hybrid. GIX autoimmunization, therefore, may constitute a natural example of experiments in which matings between mice that are nonresponsive to certain antigens yield responsive progeny. Production of GIX antibody by the hybrids increased progressively with age and was accompanied by decreased expression of GIX antigen on their thymocytes. This phenomenon is attributed to antigenic modulation. Pronounced splenomegaly, evidently nonleukemic, and histological lesions in the male reproductive tract where large amounts of GIX-gp70 are normally secreted have been observed in the hybrids, indicating that they are liable to a pathological autoimmune syndrome and are not completely protected by antigenic modulation. The special interest of this syndrome is that it presumably signifies the consequences of autoimmunization to a single type C virus component, expressed without significant virus production, in a mouse with no evident genetic predisposition to such disease in the absence of that antigen. (23 references)

6844 STUDIES ON THE ERYTHROPOIETIC CELL SYSTEM IN CBA MICE AFTER RAUSCHER VIRUS INFECTION.

(Eng.) Seidel, H.-J. (Zentrum fuer Klinische Grundlagenforschung der Universitaet, Oberer Eselsberg, 7900 Ulm/Donau, West Germany). *Blut* 32(4): 257-268; 1976.

Erythropoiesis was studied in Rauscher leukemia virus-infected CBA mice using the incorporation of ^{59}Fe into spleen, bone marrow, and peripheral blood. Beginning at day 4, an increased uptake into the spleen and a decrease in the bone marrow and the peripheral blood occurred. The increased uptake by the spleen was also found in plethoric mice. The erythropoietin-responsive compartment was enlarged in the spleen of these mice. The dose-response curve for erythropoietin was altered 4 days after infection, there was a higher background level of ^{59}Fe incorporation, and the response to low doses was better in infected animals. The reticulocytopenia common in these mice was overcome by the administration of high doses of erythropoietin. It is concluded that the Rauscher virus acts in a similar manner to erythropoietin, but the erythropoiesis induced is ineffective since the cells do not mature. This maturation deficiency is influenced by the administration of exogenous erythropoietin. (22 references)

6845 SPECIFIC ANTIGEN OF THE MURINE ERYTHROBLASTS. (Eng.) Ievleva, E. S. (Lab. Tumor Immunochemistry, N. F. Gamaleya Inst. Epidemiology and Microbiology, Moscow, USSR); Engelhardt, N. V.; Abelev, G. I. *Int J Cancer* 17(6): 798-805; 1976.

The immunochemical properties of a new antigen revealed by antisera against Rauscher virus in mice with Rauscher virus-induced leukemia were studied. Electrophoretic mobility and immunochemical specificity showed the antigen to be different from both Rauscher type-specific antigen and MULV-gs-I (p-30). It also occurred in low levels in both serum and spleen extracts of healthy mice of several strains. The antigen was regularly demonstrated by immunofluorescence on the surface of erythroblasts, but not on the surface of RBC, lymphocytes, polymorphonuclear cells, and thymocytes, and it was different from fetal hemoglobin. Therefore, it is referred to as an antigen of erythroblasts (Ag-Eb) and apparently represents a surface marker for a certain differentiation stage of erythroid cells. (23 references)

6846 MEMBRANE CHARACTERISTICS OF OLD AND RAUSCHER LEUKEMIA VIRUS INFECTED MOUSE RED BLOOD CELLS. (Eng.) Knyszynski, A. (Section Biological Ultrastructure, Weizmann Inst. Science, Rehovot, Israel); Danon, D. *Exp Cell Res* 100(2): 303-308; 1976.

Some membrane characteristics of normal and Rauscher leukemia virus (RaLV)-infected male SWR mouse RBC were compared with regard to total populations and to young and old groups of cells. Osmotic fragility, density distribution of cells, and agglutinability by poly-L-lysine (pLys), concanavalin A (Con A), phytohemagglutinin (PHA), and soybean agglutinin (SBA) were examined. RBC from RaLV-infected mice were agglutinated at a higher rate and to a higher degree than normal mouse RBC by pLys and by the lectins PHA and Con A. These RBC were generally osmotically more resistant and contained a young cell population of unusually high specific gravity. Comparison of RBC from RaLV-infected mice with old RBC from normal mice showed some common membrane characteristics. Similarly to old RBC, RBC from RaLV-infected mice had a high specific gravity and high agglutinability by pLys. However, they differed in that the RBC from RaLV-infected mice were osmotically more resistant and were agglutinated by Con A; they were also agglutinated at a higher rate by PHA. (28 references)

6847 AUTOGENOUS IMMUNITY TO MOUSE MAMMARY TUMOR VIRUS IN MOUSE STRAINS OF HIGH AND LOW MAMMARY TUMOR INCIDENCE. (Eng.) Ihle, J. N. (Basic Res. and Viral Oncology Programs, Natl. Cancer Inst. Frederick Cancer Res. Center, Frederick, MD 21701); Arthur, L. O.; Fine, D. L. *Cancer Res* 36(8): 2840-2844; 1976.

Specific radioimmune precipitation assays were used to demonstrate mouse mammary tumor virus (MMTV)-prec itating antibodies in the high-spontaneous mammary tumor strains of mice: C3H/HeN+, GR/N, BALB/cfC3H, and C57BL/6 x C3H F_1 (B6C3F_1). Antibody titers in C3H/HeN+ mice increased with age, the highest titers occurring in tumor-bearing animals. MMTV-precipitati antibodies were not detectable by radioimmune precip tation assay in low-mammary tumor strains (AKR, BALB/c, C57BL/6, and C3H/HeN), but were detectable in MMTV-inoculated BALB/c mice. The appearance of antibodies preceded palpable tumor formation, and antibody titers were directly correlated to virus dose. The coexistence of antibody to MMTV in C3H/HeN and B6C3F_1 mice and the murine leukemia virus natural antibody, as determined by competition radioimmun assays, suggests that the hybrid strain responds to the C3H component of the cross. (21 references)

6848 MAMMARY TUMOUR VIRUS (MTV)-SPECIFIC IMMUN COMPLEX DEPOSITS IN RENAL GLOMERULI OF MTV-INFECTED TUMOUR-FREE MICE. (Eng.) Zotter, S. (Pathological Inst., Medical Acad. ''Carl-Gustav-Carus,'' 8053 Dresden, East Germany); Lossnitzer, A.; Klaehr, G. *Acta Biol Med Ger* 35(2): 253-257; 1976.

With the use of direct and indirect immunofluorescence tests, mammary tumor virus (MTV)-specific immune complex deposits were found in tumor-free female mice of the strains C3H/Bln, CBA/Bln, XVII/BlnfCBA/Bln, and CBA/BlnfXVII/Bln. These deposits consisted of immunoglobulin, complement, and MTV antigen(s). The immune complex deposition increased with age. Antibodies eluted from renal tissue homog enate reacted with both MTV-A and -B particles in immunofluorescence tests performed on mouse mammary tumor slices. The results confirm earlier findings of age-dependent spontaneously occurring anti-MTV antibodies in naturally infected mice. (36 references)

6849 ENDONUCLEOLYTIC CLEAVAGE OF MURINE LEUKEM VIRUS 35S RNA BY MICROSOME-ASSOCIATED NUCLEASE. (Eng.) Shanmugam, G. (Inst. Molecular Virology, Saint Louis Univ. Sch. Medicine, St. Loui MO 63110). *Biochem Biophys Res Commun* 70(3): 818-82 1976.

Moloney murine leukemia virus (MLV) 35S RNA (molecular wt 3-3.4 x 10^6) was cleaved by nuclease activity present in microsomal fractions from MLV infected or uninfected Swiss mouse embryo cells to two RNA species of approximate molecular wt 1.8 x 10^6 and 1.5 x 10^6. Microsomal fractions from MLV-infected and uninfected cells also contained nucleolytic activity that solubilized ^{3}H-poly(A)·poly(U) but not ^{3}H-poly(C) or ^{3}H-poly(U); the cleavage of poly(A)·poly(U) was inhibited by ethidium bromide. The cleavage of MLV RNA was also inhibited by ethidium bromide, suggesting double stranded regions in 35S RNA as the site of cleavage. (18 references)

6850 MIXED LYMPHOCYTE TUMOR-CELL INTERACTION IN A MURINE SARCOMA VIRUS (MOLONEY)-INDUCED
TUMOR SYSTEM. COMPARISON BETWEEN LYMPHOPROLIFERATION
AND LYMPHOCYTE CYTOTOXICITY. (Eng.) Kirchner, H.
(Lab. Immunodiagnosis, NCI, Bethesda, MD 20014);
laser, M.; Holden, H. T.; Herberman, R. B. *Int J*
ancer 17(3): 362-369; 1976.

tudies of the mixed lymphocyte/tumor-cell interac-
tion (MLTI) were performed in a primary murine sar-
coma virus (MSV)-induced tumor system using male
57Bl/6 mice. Reactivity against mitomycin C-treated
BL-5 cells could be detected during a limited period
t about 14 days after im virus injection. The degree
f reactivity of MSV 14 spleen cells was quite vari-
ble; stimulation indices ranged from 2.2 to 9.4.
ctivity in the MLTI appeared to be largely depend-
nt on T lymphocytes. A relatively broad spectrum of
pecificity was demonstrated in experiments using
dditional stimulating cells besides RBL-5. The
inetics of the MLTI correlated well with the kin-
tics of the primary cytotoxic response in the CRA
gainst RBL-5 cells. However, positive results in
he in vivo and in vitro secondary cytotoxicity
ssays could be detected between 21 and 100 days
fter MSV injection when the MLTI was negative.
ransplantation resistance against challenge with
BL-5 tumor cells also persisted for a long time
fter MSV inoculation. The results indicate that the
LTI, in contrast to the secondary cytotoxicity
ssays, does not correlate well with the status of
n vivo immunity. (24 references)

51 KINETICS OF DNA AND HISTONE MESSENGER RNA SYNTHESIS IN SV-1 MONKEY KIDNEY CELLS
FECTED WITH SIMIAN VIRUS 40. (Eng.) Liberti, P.
aboratoria di Biologia Cellulare del Consiglio
zionale delle Richerche Via Romagnosi 18A, Rome,
aly); Fischer-Fantuzzi, L.; Vesco, C. *J Mol Biol*
5(2): 263-273; 1976.

stone messenger RNA (histone mRNA) was identified
CV-1 monkey kidney cells, and its synthesis during
e simian virus 40 (SV40) productive cycle was
rrelated with the synthesis of cellular DNA and
ral DNA. In confluent cultures of CV-1 cells,
fection with SV40/5 (a high-yield clone of SV40)
omoted an increase in cellular DNA synthesis fol-
wed by a decline. During this decline viral DNA
nthesis continued to rise and eventually surpassed
at of cellular DNA. The synthesis of histone mRNA
rose concomitantly with the increase in the synthesis of cellular DNA in a fashion similar to that when confluent CV-1 cultures are stimulated by the addition of fresh serum to the growth medium. However, whereas in cells stimulated with serum the synthesis of histone mRNA closely paralled that of cellular DNA, in cells infected with SV40, histone mRNA synthesis continued at a high rate even after the decline of cellular DNA synthesis. The rate of histone mRNA synthesis thus appears to be coupled to the total (cellular plus viral) DNA synthesis and not to the synthesis of the host DNA alone. The high rate of synthesis of the FI histone at late times after infection suggests that histone genes are transcribed coordinately. (47 references)

6852 EFFECT OF PASSAGE IN CULTURE ON A CLONE OF BALB/C 3T3 CELLS TRANSFORMED BY SIMIAN VIRUS 40. (Eng.) Smith, H. S. (Cell Culture Lab., Sch. Public Health, Univ. California, Berkeley, CA 94720); Turner, S.; Leong, J.-A.; Rigby, P. W. *J Virol* 19(1): 146-153; 1976.

To determine whether virus-induced properties are stable as a function of passage, one transformed clone, FNE, which was isolated after SV40 infection of BALB/c 3T3 cells in factor-free medium, was extensively characterized. From the initial testing at passage 5 and for at least 50 subsequent subcultures, the cells stably maintained high saturation density, morphology, colony formation on contact-inhibited monolayers, tumorigenicity, and synthesis of viral-specific RNA. However, other transformed growth properties varied as a function of passage. There was a slight decrease in viral genome equivalents per cell from 1.1 copies/cell at passage 5 to 0.7 copy at passage 40. Initially, the cells were negative for all type C virus; however, cells carried at low density for 13-20 passages (65-100 generations) began to release an endogenous type C virus that then persisted in the culture. Spontaneous release of this virus did not occur in control BALB/c 3T3 cells carried under identical culture conditions for 90 passages. When the cultures were releasing type C viruses, they stained uniformly and brightly positive for SV40 tumor (T) antigen by immunofluorescence, whereas T antigen staining was variable at early passage. These experiments suggest that subtle but perhaps important differences in viral gene expression can occur as a function of passage; they also demonstrate the importance of evaluating the interactions between SV40 and endogenous type C viruses. (38 references)

6853 ISOLATION OF AN SV40 INDUCED SARCOMA TRANSFORMATION ASSOCIATED ANTIGEN. (Eng.) Brawn, R. J. (Dept. Biochemistry, Scripps Clinic and Res. Foundation, LaJolla, CA 92037); Holtz, J. K.; Dandliker, W. B. *Res Commun Chem Pathol Pharmacol* 14(3): 551-565; 1976.

A transformation-associated antigen was isolated from a simian virus 40-induced hamster sarcoma by sequential silica gel column chromatography and preparative silica gel 60 thin layer chromatography after tissue extraction with chloroform:methanol (2:1, v/v). It migrated with an rf of 0.21 on silica gel 60 thin layer chromatography plates predeveloped and developed in chloroform:methanol:water:glacial acetic acid (10:10:1.5:0.5, v/v) and an rf of 0.27 on cellulose F_{254} thin layer chromatography plates developed in the same solvent system. Antigenicity was determined by a fluorescence probe cytotoxicity assay to measure inhibition of antibody-mediated complement-dependent damage to homologous cultured transformed cells. The results suggest that the substance is a polar lipid, and they support the concept that transformation-associated antigens may be gene-plus-substrate specific rather than strictly gene specific. (26 references)

6854 ISOLATION AND PROPAGATION OF A SEGMENT OF THE SIMIAN VIRUS 40 GENOME CONTAINING THE ORIGIN OF DNA REPLICATION. (Eng.) Shenk, T. E. (Dept. Biochemistry, Stanford Univ. Sch. Medicine, Stanford, CA 94305); Berg, P. *Proc Natl Acad Sci USA* 73(5): 1513-1517; 1976.

A heteroduplex DNA molecule, constructed from the DNA of a simian virus 40 (SV40) mutant with a deletion of the map region 0.54-0.55 and the DNA of a second SV40 mutant having a deletion of the map segment 0.70-0.73, was cleaved twice with S1 endonuclease. One of the products was a DNA fragment of about 0.13 the length of SV40 DNA, which contains the origin of SV40 DNA replication (0.67 on the SV40 DNA map). Infection of cultured CV-1 monkey kidney cells with the fragment and intact SV40 DNA yielded, in addition to full-length wild-type circular DNA molecules, a population of discrete size circular DNAs whose lengths were very nearly integral multiples of the infecting fragment. Restriction endonuclease digestion patterns and heteroduplex analysis indicated that the small circular DNAs were oligomers of the infecting fragment, organized in 'head-to-tail' and, less frequently, 'head-to-head' arrangement. (20 references)

6855 CHARACTERISTICS OF PROLIFERATIVE CELLS FROM YOUNG, OLD, AND TRANSFORMED WI 38 CULTURES. (Eng.) Bowman, P. D. (Dept. Biology, Div. Natural Sciences, Univ. California, Santa Cruz, CA 95064); Daniel, C. W. *Adv Exp Med Biol* 53: 107-122; 1975.

Mitotic cells were obtained by a shake-off procedure from cultures of normal WI 38 cells and simian virus 40-transformed cells. The size of all mitotic WI 38 cells was similar regardless of in vitro age, whereas cells from the monolayer displayed an age-related increase in size. Mitotic transformed cells were similar to normal cells in size, but there were no size changes in transformed monolayer cells during serial passage. There was no consistent change in the numbers of mitochondria or lysosomelike bodies in the mitotic WI 38 cells during aging in culture. Mitotic transformed cells displayed numbers of mitochondria comparable to normal cells, but lysosomelike bodies occurred less frequently. The results support the contention that aging in WI 38 cultures is characterized by a declining fraction of homogeneous, actively dividing cells and an increasing fraction of heterogenous nondividers that display senescent changes. (23 references)

6856 CHARACTERIZATION OF SUPERCOILED OLIGOMERIC SV40 DNA MOLECULES IN PRODUCTIVELY INFECTE CELLS. (Eng.) Martin, M. A. (Natl. Inst. Allergy and Infectious Diseases, Natl. Insts. Health, Bethesda, MD 20014); Howley, P. M.; Byrne, J. C.; Garon, C. F. *Virology* 71(1): 28-40; 1976.

Oligomeric supercoiled forms of simian virus 40 (SV40) DNA, which appear during the latter stages of productive infection and account for more than 10% of the intracellular viral DNA 70 hr after infection were characterized. The sedimentation constants of oligomeric DNA under neutral and alkaline conditions and the electrophoretic mobilities of the different supercoiled forms were determined. Nucleic acid hybridization studies as well as cleavage with bacterial restriction endonucleases indicated that oligomeric supercoiled DNA molecules contain only SV40 DNA sequences. These unintegrated viral DNA forms appeared predominantly in the Hirt pellet and sedimented in regions of alkaline sucrose gradients characteristic of high molecular wt cellular DNA. DNA.

6857 SEARCH FOR ANTIGENS AND ANTIBODIES CROSS-REACTIVE WITH TYPE C VIRUSES OF THE WOOLLY MONKEY AND GIBBON APE IN ANIMAL MODELS AND IN HUMANS (Eng.) Stephenson, H. R. (Lab. RNA Tumor Viruses, NCI, Bethesda, MD 20014); Aaronson, S. A. *Proc Natl Acad Sci USA* 73(5): 1725-1729; 1976.

The possible presence of woolly monkey viral antigens in human tissues or of antibodies directed against structural polypeptides of woolly monkey viruses in human sera was studied. The results were negative. However, it was possible to demonstrate viral antigens in tissues and antibodies reactive t viral components in several animal and even primate model systems. Evidence against the presence of woolly monkey viruses in humans included failure to identify spontaneous or chemically induced viruses of this group in the more than 200 individual cultures of human origin examined. These findings argu against the likelihood that viruses closely related to the woolly monkey virus are associated with huma tumors or are common infectious agents of man. (41 references)

6858 EXPERIMENTAL INFECTION OF HUMAN FORESKIN CULTURES WITH BK VIRUS, A HUMAN PAPOVAVIRUS. (Eng.) Shah, K. V. (Dept. Pathobiology, Johns Hopkins Univ., Sch. Hygiene and Public Health, Balt more, MD 21205); Hudson, C.; Valis, J.; Strandberg, J. D. *Proc Soc Exp Biol Med* 153(1): 180-186; 1976.

Cell cultures derived from the foreskins of 19 newborn infants were exposed to irradiated or unirradiated BK virus (BKV), a simian virus 40 (SV40)-related papovavirus infection of man, and observed for viral cytopathic effects and for possible transformation. Four of the cultures were passed serially and maintained for 9 wk on medium containing BKV antiserum. All inoculated cultures, whether they were infected with irradiated or unirradiated virus, eventually developed BKV cytopathic effects. The effect of increased irradiation time was to progressively delay the onset of BKV cytopathic effects. In 14 foreskin cultures infected with unirradiated virus, 24% of the cells showed BKV viral antigen 5 days after infection. In the groups of cultures infected with irradiated virus, 9.9%-1.4% of the cells exhibited BKV viral antigen. The time between the first appearance of cytopathic effects and complete cell destruction varied from 2-7 wk. In almost half of the cultures, some regrowth occurred following extensive virus-induced destruction, but the regrown cells remained infected with BKV and did not grow rapidly enough to permit frequent passage. In two cases, regrown cells (JV-1 and JV-2) could be assed. These cultures were essentially free of BKV iral antigen but contained, in over 90% of the ells, the intranuclear T antigen. JV-1 and JV-2 ultures were resistant to BKV infection. The conrol cultures were fibroblastic, with long, spindlehaped cells, but the cells of JV-1 and JV-2 were ranular and pleomorphic, with a predominance of tellate cells and multinucleated giant cells. Thus, ells from these two cultures met some of the crite- ia of viral transformation. They did not, however, xhibit the accelerated growth rate and high saturaion densities that are characteristic of some transormed cell lines, and they could not be maintained eyond the 30th passage. (15 references)

859 ANTIBODIES TO BK VIRUS STRUCTURAL AND TUMOR ANTIGENS IN HUMAN SERA FROM NORMAL ERSONS AND FROM PATIENTS WITH VARIOUS DISEASES, NCLUDING NEOPLASIA.

(Eng.) Corallini, A. (Inst. icrobiology, Univ. Bologna, Bologna, Italy); Baranti-Brodano, G.; Portolani, M.; Balboni, P. G.; rossi, M. P.; Possati, L.; Honorati, C.; La Placa, .; Mazzoni, A.; Caputo, A.; Veronesi, U.; Orefice, .; Cardinali, G. *Infect Immun* 13(1): 1684-1691; 976.

epidemiological study was made of the prevalence antibodies to BK virus (BKV) capsid antigens in ra from 1,279 patients with various diseases. The rcentage of positive sera was comparable in all seases except rheumatoid arthritis and chronic phropathies, where a slightly higher prevalence s found. Sera from 952 patients with tumors were amined for the presence of antibodies to BKV mor and capsid antigens in comparison with a tched control group of 501 blood donors. Sera om 11 tumor patients (1.15%) and from normal ntrols (0.80%) had antibodies to BKV tumor antigen. higher prevalence of antibodies to BKV capsid tigens was found in any cancer type except in rcinomas of the urinary bladder, where the percenge of positive sera and of sera with high titers s higher than in other groups. The results tend to pport the hypothesis that BKV infection is activat- by immunosuppressive therapy and is not involved the pathogenesis of these diseases. (45 refer- ces)

6860 IDENTIFICATION OF THE STUMPTAILED MACAQUE VIRUS AS A NEW PAPOVAVIRUS.

(Eng.) Reissig, M. (Dept. Pathobiology, Sch. Hygiene and Public Health, Johns Hopkins Univ., Baltimore, MD 21205); Kelly, T. J.; Daniel, R. W.; Rangan, S. R.; Shah, K. V. *Infect Immun* 14(1): 225-231; 1976.

A new virus, stumptailed macaque virus (STMV), was isolated from uninoculated stumptailed macaque kidney cultures. The virions had the size and morphology of papovaviruses of the simian virus 40 (SV40)-polyoma subgroup, but many appeared to have an additional outer envelope. The DNA was a superhelical circular molecule, with a mean length 91% of that of SV40. Immune electron microscopy of isolated virions and immunofluorescent staining of virus-infected cells showed that STMV was immunologically distinct from SV40, BK virus (BKV), polyoma virus, and JC virus. Its tumor antigen may be related to those of SV40 and BKV. (23 references)

6861 MAPPING OF THE THREE SPECIES OF POLYOMA mRNA.

(Eng.) Turler, H. (Dept. Molecular Biology, Univ. Geneva, 1211 Geneva, Switzerland); Salomon, C.; Allet, B.; Weil, R. *Proc Natl Acad Sci USA* 73(5): 1480-1484; 1976.

The polyoma messenger RNAs (mRNAs) present in the cytoplasm of primary cultures of mouse kidney cells during lytic infection were characterized by sedimentation velocity analysis and by hybridization to polyoma DNA fragments generated by a specific endonuclease of *Hemophilus parainfluenzae (Hpa* II). Three distinct species of polyoma mRNAs were found and mapped on the viral genome. There were early 19S polyoma mRNA, complementary to about 45% of the early strand (78,(5' end) to 23(3' end) map units); and two related late mRNAs, a larger species (19 S), complementary to about 44% of the late strand (70(5' end) to 26(3' end) map units) and a smaller species (16 S) complementary to about 31% (61(5' end) and 30(3' end) map units). Thus, the entire sequence of the late 16S mRNA is comprised within the late 19S mRNA. (21 references)

6862 TRANSCRIPTION OF POLYOMA VIRUS DNA AFTER INTERACTION WITH NUCLEAR PROTEINS IN VITRO.

(Eng.) Meneguzzi, G. (Istituto di Genetica dell'Universita, Via S. Epifanio 14, 27100 Pavia, Italy); Pignatti, P. F.; Milanesi, G. *Biochem Biophys Res Commun* 72(2): 626-633; 1976.

The effect of nuclear proteins on transcription was studied by preincubating polyoma virus superhelical or linear DNA with nonhistone chromosomal proteins (NHP) or histones, then adding eukaryotic RNA polymerase B, and following the incorporation kinetics for 30 min. NHP added to DNA at a NHP/DNA weight ratio of 0.5/1 inhibited transcription of superhelical DNA by 30% but did not affect transcription of linear DNA. Total histones added at a protein/DNA ratio of 0.6/1 inhibited transcription of superhelical DNA completely and of linear DNA by 45%. In sedimentation experiments NHP binding to superhelical and linear polyoma DNA could be correlated to the effect of NHP on transcription, in that NHP bound preferentially to the DNA species (the superhelix) whose transcription they affected most. When histones were mixed with linear polyoma DNA at a histone/DNA ratio of 0.6/1, there was an increase in sedimentation velocity; no changes were observed with superhelical DNA. The following conclusions were drawn concerning the effects of histones on DNA transcription: (1) histones bind preferentially to linear polyoma DNA with respect to the superhelical and circular nicked forms; (2) the complete inhibition of transcription of polyoma DNA by histones is probably not the result of DNA aggregation but of histones-DNA interaction in solution; and (3) interaction with histones seems to be much more effective in blocking RNA polymerase action on superhelical than on linear DNA. Histones and NHP have different effects on the transcription of polyoma DNA, depending on the physical state of the DNA molecule. (18 references)

6863 ISOLATION AND CHARACTERIZATION OF POLY(A)-CONTAINING INTRANUCLEAR POLYOMA-SPECIFIC 'GIANT' RNAS. (Eng.) Rosenthal, L. J. (Dept. Molecular Biology, Univ. Geneva, Geneva 4, Switzerland); Salomon, C.; Weil, R. *Nucleic Acids Res* 3(5): 1167-1183; 1976.

Heterogeneous polyoma (Py) giant RNA molecules were isolated by oligo(dT)-cellulose chromatography during the late phase of a lytic cycle of infection of mouse kidney cell cultures. These RNAs had sedimentation coefficients in denaturing dimethyl sulfoxide (DMSO) gradients greater than 26S; thus they corresponded to RNA molecules larger than one strand of Py DNA. Approximately 15% of total nuclear Py late giant RNAs contained tracts of poly(A) and were retained by oligo(dT)-cellulose. The Py late giant RNAs and heterogeneous nuclear RNAs (HnRNAs) had a slightly lower sedimentation rate in DMSO-chloral hydrate density gradients than sedimentation values in sucrose gradients indicated. Even when synthesis of viral DNA and the production of capsid protein were blocked by 5-fluorodeoxyuridine (FUdR), 10% of Py-specific RNA contained tracts of poly(A). In contrast to findings on Py late giant RNA, nuclear Py RNA synthesized in the presence of FUdR sedimented in denaturing DMSO-chloral hydrate gradients considerably slower (from 15S to 30S) in relation to HnRNA and ribosomal precursor RNA. The sedimentation pattern in denaturing DMSO gradients suggests that Py RNA synthesized late in lytic infection in the presence of FUdR may be no longer than one transcript of Py DNA. (18 references)

6864 MATERIALS RELEASED INTO CULTURE MEDIUM BY NORMAL AND ONCOGENIC VIRUS-TRANSFORMED MAMMALIAN CELLS. (Eng.) Voyles, B. A. (Dept. Biological Sciences, Purdue Univ., West Lafayette, IN 47907); Moskowitz, M. *Biochim Biophys Acta* 444(1): 269-285; 1976.

Materials released into culture medium by transformed (21-PyH/6) and untransformed (21/c13) baby hamster kidney (BHK) cells labelled with glucosamine, sulfate, fucose or leucine were characterized. Some of the components could also be labelled by iodination of intact cells, indicating their surface origin. Analysis on gradient polyacrylamide sodium lauryl sulfate gels demonstrated that a group of high apparent molecular weight glucosamine-labelled components were more abundant in materials released from Rous sarcoma virus-transformed BHK cells than from BHK cells or polyoma virus-transformed BHK cells. The relative rates of release of glucosamine-labelled components from transformed and untransformed cells were similar except that the transformed BHK cells released some large molecular weight components slightly more rapidly than BHK cells. Treatment of labelled medium materials with testicular hyaluronidase removed much glucosamine label from the materials but did not affect the amounts of other labels. After treatment with hyaluronidase, the patterns of labelled conditioned media from both transformed and untransformed BHK cells were qualitatively and quantitatively very similar, suggesting that the differences seen in untreated labelled conditioned media were due to the presence of hyaluronidase-sensitive materials associated with mediu materials rather than to actual differences in glycoproteins. (25 references)

6865 HYBRIDIZATION OF mRNA FROM ADENOVIRUS-TRANSFORMED CELLS TO SEGMENTS OF THE ADENOVIRUS GENOME. (Eng.) Bachenheimer, S. (Rockefeller Univ., New York, NY 10021); Darnell, J. E. *J Virol* 19(1): 286-289; 1976.

Cytoplasmic viral-specific RNA from the 8617 line of adenovirus type 2(Ad2)-transformed rat cells was hybridized to DNA fragments derived by Eco·RI or Sma-I restriction endonucleases. Three viral RNA classes (26S, 20S, and 15S) were detected by hybridization of total cytoplasmic RNA with the RI-A fragment, and all three also hybridized to the much smaller Sma-E fragment of Ad2 DNA. Poly(A)-containing RNA (exposed to 90% formamide) contained only the 20S and 15S mRNA species, suggesting that the 26S RNA might be an aggregated species. Viral RNA o the same size derived from the same regions of the genome was not detected in lytically infected cells suggesting some change in the transcription pattern or RNA processing of the Ad2 DNA in the integrated state. (12 references)

6866 DIFFERENTIAL EFFECT OF PHOSPHONOACETIC ACID ON THE EXPRESSION OF EPSTEIN-BARR VIRAL ANTIGENS AND VIRUS PRODUCTION. (Eng.) Nyormoi O. (Sidney Farber Cancer Center, Harvard Medical Sch., 35 Binney St., Boston, MA 02115); Thorley-Lawson, D. A.; Elkington, J.; Strominger, J. L. *Pro Natl Acad Sci USA* 73(5): 1745-1748; 1976.

The effects of phosphonoacetic acid on cell growth, expression of Epstein-Barr virus antigens, and viru production in human and marmoset lymphoblastoid cel lines were studied. The drug had no significant effect at concentrations up to 100 μg/ml on cell growth or total cell DNA synthesis. Higher doses induced a drastic decrease in DNA synthesis and cel

growth and a dramatic cell enlargement. Immunofluor-
escence studies showed that ≥ 30μg/ml of phosphono-
acetic acid inhibited viral capsid antigen synthesis
without affecting the expression of the nuclear
antigen or the spontaneous and 5-iodo-2'-deoxyuridine-
nduced early antigens. Production of transforming
pstein-Barr virus was also blocked. Inhibition of
iral capsid antigen expression and of virus produc-
ion at low doses was reversible. The transforming
irus produced after the removal of the drug from
he B95-8 marmoset cell line transformed peripheral
lood lymphocytes as effectively as virus prepared
rom untreated cells. Because the expression of
iral capsid antigen but not early antigen requires
iral DNA synthesis, these results suggest that
hosphonoacetic acid interferes specifically with
iral DNA synthesis at concentrations that do not
ffect cellular DNA synthesis. (26 references)

867 ANTI-EBV ANTIBODY TITERS IN NON-HODGKIN
LYMPHOMAS. (Eng.) Dumont, J. (Unite de
echerche Clinique, Dept. Hematology, Hopital Saint
ouis, 75475 Paris, Cedex 10, France); Liabeuf, A.;
enle, W.; Feingold, N.; Kourilsky, F. M. *Int J*
ancer 18(1): 14-23; 1976.

ntibody titers to Epstein-Barr virus (EBV)-related
ntigens, i.e., viral capsid antigen (VCA), the D
nd R components of the early antigen (EA) complex,
nd the EBV-associated nuclear antigen (EBNA), were
etermined in 86 patients with non-Hodgkin lymphomas
nd 150 matched control subjects. The lymphomas were
iffuse, nodular, hyperbasophilic malignant lymphoma
ML) or unclassified. The EBV-related serological
ata were compared to the incidence of antibodies to
ther herpesviruses, i.e., cytomegalovirus, herpes
implex virus, and varicella zoster virus, and
orrelated with immune disorders, which are partic-
larly frequent in HML lymphomas. There was a sig-
ificantly higher incidence of anti-EA D titers
n lymphoma patients and slight but significant
ncreases in the geometric mean anti-VCA titers
n the HML and unclassified group of patients.
ese elevated anti-EBV titers in patients were not
sociated with an increase in titers of antibodies
other herpes viruses. They did not correlate with
e signs of immune deficiency observed or with the
cidence of autoantibodies. (36 references)

68 EPSTEIN-BARR VIRUS: EXPERIMENTAL INFECTION
OF *CALLITHRIX JACCHUS* MARMOSETS. (Eng.)
lk, L. (Depts. Microbiology, Rush-Presbyterian-St.
ke's Medical Center, Chicago, IL); Deinhardt, F.;
lfe, L.; Johnson, D.; Hilgers, J.; De-The, G. *Int*
Cancer 17(6): 785-788; 1976.

ght common marmoset monkeys (*Callithrix jacchus*)
re inoculated with about 10^4 transforming units of
rus from the Epstein-Barr virus-transformed strain
the cotton-topped marmoset cell line, B95-8, to
termine the nature of the induced lesions. Seven
the marmosets died 50-111 days postinoculation,
d all seven showed microscopic and/or macroscopic
sions compatible with a diagnosis of lymphoprolif-
ative disease. Low levels of anti-VCA antibodies
were detected in plasma from six marmosets. Continuous EBV-carrying lymphoblastoid cell cultures could not be established by cultivation in vitro of circulating lymphocytes or minced lymphoid tissues obtained at necropsy. It is concluded that common marmosets have a lower susceptibility to the virus than cotton-topped marmosets, but they may be excellent models for the study of infectious mononucleosis type responses and nasopharyngeal carcinoma. (15 references)

6869 STRUCTURE OF *HERPESVIRUS SAIMIRI* GENOMES: ARRANGEMENT OF HEAVY AND LIGHT SEQUENCES IN THE M GENOME. (Eng.) Bornkamm, G. W. (Institut fur Klinische Virologie der Universitat Erlangen-Nurnberg, 8520 Erlangen, West Germany); Delius, H.; Fleckenstein, B.; Werner, F.-J.; Mulder, C. *J Virol* 19(1): 154-161; 1976.

The intramolecular arrangement of heavy and light sequences within the genome of *Herpesvirus saimiri* was studied by electron microscopy. H sequences in M and H genomes cross-hybridized completely and were cleaved identically by restriction endonuclease R•*Sma* I into four classes of fragments with molecular wts of about 360,000, 300,000, 130,000, and 40,000, respectively. H sequences were chains of identical repeat units in tandem arrangement. The molecular wt of each repeat unit was about 830,000. L sequences had no cleavage site for endo R•*Sma* I. H sequences were terminally arranged at both ends of the M genome, as seen by electron microscopy after partial denaturation. The length of the individual heavy ends varied between 21 μm and less than 1 μm, whereas the light region was uniform in size (35.3 μm). As a rule, molecules with a long heavy end at one side had a short heavy end at the other side, thus giving rise to a limited size heterogeneity. Orientation of M DNA molecules by the denaturation map of the light region showed that the longer heavy end may be located at the left or at the right side of the M genome. (18 references)

6870 CONTROL OF THE EXPRESSION OF A HERPES SIMPLEX VIRUS THYMIDINE KINASE GENE INCORPORATED INTO THYMIDINE KINASE-DEFICIENT MOUSE CELLS. (Eng.) Kaufman, E. R. (Div. Human Genetics, Children's Hosp. Medical Center, Boston, MA); Davidson, R. L. *Somatic Cell Genet* 1(2): 153-164; 1975.

Thymidine kinase-deficient mouse cells transformed by inactivated herpes simplex virus and expressing viral thymidine kinase (TK) activity were grown in nonselective medium. There was an exponential decay in the proportion of cells that continued to express the viral enzyme, but the viral TK could be reactivated at a frequency of approximately one cell in 10^6 in every population that had lost TK activity. When cells with reactivated viral TK were grown in nonselective medium, a decay in the expression of the viral enzyme occurred again at the same rate as in the initial transformed population. Studies on the reactivation of viral TK indicated that reappearance of the enzyme was not induced by the selective medium (HAT) used to detect cells in which the enzyme has reappeared. Furthermore, treatments known to induce latent viruses in other systems--e.g., exposure of the cells to mutagens or cell fusion--did not affect the frequency with which viral TK was reactivated. (12 references)

6871 ANALYSIS OF HERPES SIMPLEX VIRUS DNA SYNTHESIZED IN INFECTED NUCLEI BY CHROMATOGRAPHY ON BENZOYLATED NAPHTHOYLATED DEAE CELLULOSE COLUMNS. (Eng.) Shlomai, J. (Dept. Microbiology, Univ. Chicago, Chicago, IL); Strauss, B.; Asher, Y.; Friedmann, A.; Becker, Y. *J Gen Virol* 32(2): 189-204; 1976.

The nature of the DNA molecules synthesized in the nuclei of herpes simplex virus (HSV)-infected cells in vivo and in vitro was studied by chromatography on BND-cellulose columns after shearing to DNA fragments of 10 to 20 x 10^6 daltons. The incorporation of labeled precursors occurred in the DNA fragments containing single-stranded regions, presumably the replication forks. Prolongation of DNA synthesis led to the accumulation of labeled DNA fragments that lacked single-stranded sequences. Analysis of the isolated DNA fragments by density centrifugation in CsCl gradients revealed that most of the labeled DNA molecules were of virus specificity and the minority were cellular DNA fragments. Double-stranded virus DNA fragments and virus DNA fragments containing single-stranded sequences banded in CsCl gradients at a density of 1.718 g/ml, the density of virion DNA. This suggests that the replicating HSV DNA molecules have the same density as the virion DNA and contain relatively little single-stranded DNA. The synthesis of HSV DNA molecules under in vitro conditions in isolated nuclei occurs by incorporation of the precursors into DNA fragments with single-stranded regions. The synthesis of cellular DNA in nuclei from hydroxyurea- and cytosine arabinoside-treated cells also occurs by elongation of nascent DNA chains. (15 references)

6872 CELL-MEDIATED IMMUNE RESPONSE TO HERPES SIMPLEX VIRUS: TYPE-SPECIFIC LYMPHOPROLIFERATIVE RESPONSES IN LYMPH NODES DRAINING THE SITE OF PRIMARY INFECTION. (Eng.) Jacobs, R. P. (Dept. Epidemiology, Sch. Hygiene and Public Health, Johns Hopkins Univ., Baltimore, MD 21205); Aurelian, L.; Cole, G. A. *J Immunol* 116(6): 1520-1525; 1976.

Cell-mediated immune responses to types 1 and 2 herpes simplex virus (HSV) were studied in rabbits using an in vitro lymphocyte transformation assay. The footpad route of inoculation allowed study of the specificity and degree of localization of the responses. Rabbits inoculated in the hind footpads with infectious herpes simplex virus, HSV-1 or HSV-2 underwent vigorous type-specific lymphocyte transformation responses localized to draining lymphoid organs. Type-specificity required careful control of all in vitro culture conditions and reflected extensive serologic cross-reactivity. Although lymphocyte transformation responses could be detected with immune splenic and peripheral blood lymphocytes, presumably the result of early escape of antigen into the systemic circulation, responses by draining lymph node lymphocytes were significantly greater in magnitude. Distant lymph node lymphocytes did not respond. It is postulated that the augmented local immune response to HSV plays a significant role in controlling recurrent HSV infections. (31 references)

6873 SYNTHESIS OF HERPES SIMPLEX VIRUS-SPECIFI RNA BY AN RNA POLYMERASE II IN ISOLATED NUCLEI IN VITRO. (Eng.) Ben-Zeev, A. (Hebrew Univ.-Hadassah Medical Sch., Jerusalem, Israel); Asher, Y.; Becker, Y. *Virology* 71(1): 302-311; 1976.

The in vitro RNA synthesis in isolated nuclei of herpes simplex virus (HSV)-infected and uninfected BSC-1 cells was studied. The synthetic activities i infected and uninfected nuclei differed in their reaction kinetics, salt requirements, and the exten of RNA synthesis as a function of temperature. When the cells were infected in medium lacking arginine, the synthetic activity was reduced by 50% in the infected nuclei but remained unchanged in nuclei from arginine-deprived uninfected cells. The synthetic activity specified by the virus was closely related to the virus growth cycle. The RNA synthesi was heterogenous in size (4-28S) and hybridized efficiently with HSV DNA. In the presence of 0.4 μg/ml α-amanitin, mainly low molecular wt RNA (4-5S (4-5S) was synthesized. Some of this RNA hybridized to HSV DNA.

6874 RNA-INSTRUCTED DNA POLYMERASE ASSOCIATED WITH C-TYPE PARTICLES PRODUCED IN VIVO BY MURINE MYELOMA CELLS. (Eng.) Yaniv, A. (Sackler Sch Medicine, Dept. Human Microbiology, Tel-Aviv Univ., Ramat-Aviv, Tel-Aviv, Israel); Kleinman, R.; Eylan, E. *J Gen Virol* 32(2): 301-309; 1976.

Type C particles secreted in vivo by MOPC-315 myelo ma cells were characterized. These particles localized at a density of 1.16 g/ml in sucrose and possessed a 60S-70S RNA and an RNA-instructed DNA poly merase. Endogenous enzyme activity required manganese and was inhibited by ribonuclease or by the omission of any of the deoxynucleoside triphosphat The enzyme utilized the virus 60S-70S RNA as a template to synthesize DNA molecules that specificall hybridized to the homologous RNA. (15 references)

6875 SEARCH FOR RNA TUMOR VIRUSES IN HUMAN MALIGNANCY. (Eng.) Chandra, P. (No affil ation given). *Naturwissenschaften* 63: 431; 1976.

Investigations on the presence of RNA tumor viruse in cases of human cancer are reviewed briefly. The discovery of reverse transcriptase (RTase) led to the analysis of human neoplasias for viral footpri by biochemical probing. These studies resulted in the detection of RTase activity in human leukemic cells and indicated a possible link between RNA tumor viruses and human cancer. An infectious simi sarcoma virus (SiSV)-related type C virus (HL23V) was released from the cultured blood cells from a patient with acute myelogenous leukemia and transmitted to secondary cells. Similar virus isolates were obtained from a bone-marrow specimen of the same patient 14 mo later. The RTase activity of HL23V particles was immunologically similar to the RTase activity obtained from fresh uncultured leukemia blood cells from the same patient. Both viral and the leukemic cell RTase activities were specifically inhibited by antibodies (IgG) prepared against the RTase of SiSV. A similar immunologic relatedness has been reported between RTases from primate tumor viruses and RTase from the spleen of a child with myelofibrotic syndrome. The activity of RTase from human spleen was strongly inhibited by antibodies against RTase from human spleen, SiSV, and gibbon ape leukemia virus. Of the number of different experimental approaches to detect footprints of oncornaviruses in human tumors, the purification of oncornaviral-like DNA polymerase activities from human tumor materials, exhibiting an immunologic relatedness to RTase of primate RNA-tumor viruses, seems to be very promising. (12 references)

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See also:

* (Rev): 6613, 6615, 6617, 6618, 6619, 6622, 6633, 6645, 6646, 6647, 6663
* (Chem): 6676, 6751
* (Phys): 6795
* (Immun): 6919, 6922, 6929, 6937
* (Path): 6978, 6992

6918 DEPRESSION OF MACROPHAGE FUNCTION BY A FACTOR PRODUCED BY NEOPLASMS: A MECHANISM FOR ABROGATION OF IMMUNE SURVEILLANCE.

(Eng.) Pike, M. C. (Div. Rheumatic and Genetic Diseases, Dept. Medicine, Duke Univ. Medical Center, Durham, NC 27710); Synderman, R. *J Immunol* 117(4): 1243-1249; 1976.

Evidence that murine neoplasms depress the hosts' ability to accumulate macrophages at delayed-type inflammatory sites by producing a potent inhibitor of chemotactic responsiveness is presented. Supernatants (0.15 ml) of four different sonicated cell lines (a lymphosarcoma, hepatoma, benzpyrene-induced fibrosarcoma, and a teratocarcinoma) as well as sonicates of normal liver and spleen were injected sc in the thighs of five C3H mice. Two days later some of the mice were given ip injection of phytohemagglutinin. The mice were killed 48 hr later, and total and differential leukocyte counts of the accumulated peritoneal leukocytes were determined. The injections of supernatants from the four neoplasms depressed macrophage accumulation in response to PHA by 49%-92% when compared to animals not given supernatant injections. The injection of normal liver or spleen supernatants had no effect on macrophage accumulation. The four tumor supernatants in doses varying from 1%-30% (v/v) also inhibited the in vitro chemotactic responsiveness of the macrophages 24%-98%. When given with low numbers of neoplastic cells, the inhibitor increased the rate and frequency of tumor development, demonstrating that the cells contain factors capable of enhancing their growth in vivo. Preliminary characterization indicates the inhibitor to be heat stable and of a low molecular wt (6,000-10,000): it does not affect polymorphonuclear leukocyte chemotaxis in vitro. It is hypothesized that the inhibitor of macrophage migration produced by neoplasms plays a significant role in the early phase of spontaneous tumor development. The ability of malignant cells to produce potent inhibitors of macrophage function might be a central factor in determining whether they overcome native surveillance mechanism and become established tumors. (24 references)

6919 IN VIVO PROTECTION AGAINST SYNGENEIC GROSS VIRUS-INDUCED LYMPHOMA IN RATS; COMPARISON WITH IN VITRO STUDIES OF CELL-MEDIATED IMMUNITY.

(Eng.) Glaser, M. (Lab. Cell Biology, NCI, Bethesda, MD 20014); Lavrin, D. H.; Herberman, R. B. *J Immunol* 16(6): 1507-1511; 1976.

W/Fu rats were inoculated with a syngeneic Gross virus-induced lymphoma, (C58NT)D, and spleen cells were tested at various intervals for their in vivo activity in adoptive transfer experiments and for their in vitro reactivity in a 4-hr ^{51}Cr-release cytotoxicity assay and in a mixed lymphocyte tumor cell interaction assay. In adoptive transfer, the best protection against tumor growth occurred with immune spleen cells taken at 30 days after tumor cell inoculation (the peak of reactivity in the mixed lymphocyte-tumor cell interaction assay), whereas cells taken at 10 days (the peak reactivity in the ^{51}Cr-release cytotoxicity assay) gave only partial protection. The protection in the adoptive transfer experiments was specific for (C58NT)D associated antigens, and this correlated well with the specificity observed in the in vitro cell-mediated immunity assays. T cells, but not complement receptor-bearing cells or macrophages, were essential for protection against tumor growth in vivo and also for in vitro reactivity in the ^{51}Cr-release cytotoxicity and mixed lymphocyte-tumor cell interaction assays. (27 references)

6920 IMMUNOLOGICAL REACTIONS IN MEDULLARY CARCINOMA OF THE THYROID.

(Eng.) Maluish, A. E. (Dept. Microbiology, Univ. Queensland, Brisbane, Queensland, Australia); Halliday, W. J.; Bartley, P. C.; Lloyd, H. M. *Clin Immunol Immunopathol* 5(3): 303-307; 1976.

Three patients with medullary carcinoma of the thyroid (MCT) were tested for antitumor cell-mediated immunity and serum blocking factors by the leukocyte adherence inhibition (LAI) test. Leukocyte reactivity with both autochthonous and allogeneic MCT extracts was detected after surgical removal of the tumor. Blocking factors were present in patients with progressing MCT but disappeared after tumor removal; in one patient the serum then became unblocking. The leukocytes of seven control subjects did not react in the LAI test with MCT extracts. The results show that MCT has distinctive antigens, related to tumor type, and that the host responds in a characteristic way to these antigens. (13 references)

6921 INHIBITION OF ANTIBODY-DEPENDENT CELL-MEDIATED CYTOTOXICITY (ADCC) AS A MEANS OF DETECTION OF IMMUNE COMPLEXES IN THE SERA OF PATIENT WITH THYROID DISORDERS AND BRONCHOGENIC CARCINOMA.

(Eng.) Barkas, T. (Immunology Lab., 2 Forrest Road, Edinburgh, Scotland); Al-Khateeb, S. F.; Irvine, W. J.; Davidson, N. McD.; Roscoe, P. *Clin Exp Immunol* 25(2): 270-279; 1976.

Circulating immune complexes in the sera of patients with thyroid disorders or bronchogenic carcinoma were studied with an assay system based on the inhib tion of the antibody-dependent cell-mediated cytotoxicity activity of Liverpool hooded rat spleen cells. Increased inhibition, compared with that of the sera of age- and sex-matched controls, was found in patients with Hashimoto thyroiditis, primary hypothyroidism, and bronchogenic carcinoma. The degree of inhibition in the first two groups was markedly increased compared with that of control sera having the same IgG content. However, the resul in the lung cancer group were slightly but not significantly greater than in controls with the same level of IgG. Increased IgG levels were found in patients with Hashimoto thyroiditis and thyrotoxico and also in patients with bronchogenic carcinoma wh had mediastinal gland involvement. The lower level of sensitivity of the assay system was approximatel 600 ng of added aggregated IgG, corresponding to a concentration of 6 µg/ml in the sample assayed. It is suggested that circulating immune complexes may exist in lung cancer, but at a level below that of the present assay system. The most serious limitation of the assay was the requirement for heat inactivation. (33 references)

6922 DEFINING THE HETEROGENEITY OF ANTI-TUMOR ANTIBODY RESPONSES.

(Eng.) Segal, G. P. (Dept. Pathology, Univ. Pennsylvania Sch. Medicine, Philadelphia, PA 19174); Klinman, N. R. *J Immunol* 116(6): 1539-1546; 1976.

The humoral in vivo and in vitro antibody responses of BALB/c mice to a syngeneic MSV-induced tumor cell line were studied. Sera obtained from individual progressor and regressor mice varied greatly in total tumor-specific antibody concentration as well as immunoglobulin class distribution of the antibody, but there was no significant difference between the groups of progressor and regressor mice as a whole. Serum antibodies from all animals had extensive cross-reactivity against a variety of cell lines chosen to share one or more antigens with the cell line used for immunization. Conversely, when in vitro fragment cultures of splenic tissue from progressor and regressor mice were stimulated with tumor-related antigen, differences in responsiveness among normal, progressor, and regressor mice were observed. Antibodies from fragment cultures displayed several different cross-reactivity patterns, all of which were more restricted in specificity than serum antibodies. (24 references)

6923 SURVIVAL OF HEMATOGENOUSLY DISSEMINATED ALLOGENEIC TUMOR CELLS IN ATHYMIC NUDE MICE.

(Eng.) Fidler, I. J. (Basic Res. Program, NCI Frederick Cancer Res. Center, Frederick, MD 21701); Caines, S.; Dolan, Z. *Transplantation* 22(2): 208-212; 1976.

Either sc or iv injections of allogeneic B16 melanoma cells were given to 4- to 6-wk old congenitally athymic nude (nu/nu) mice and their heterozygous (nu/+) mice. In all nu/nu mice, the tumor allografts grew progressively, while no viable tumors were observed in nu/+ mice. B16 melanoma was labeled with ^{125}I-5-iodo-2'-deoxyuridine (^{125}IUdR), an analog of thymidine that is incorporated into the DNA of cells and remains there until death, when it is degraded in the liver and the free radioiodine is excreted in the urine. Each mouse was injected iv with a dose of 100,000 viable labeled B16 cells/0.2 ml, and five mice from both groups were killed atnitervals ranging from 2 min to 14 days postinjection. The number of original tumor cells in lungs, liver, spleen, and 0.5 ml of blood collected from each mouse was determined; tumor cells were arrested immediately in the lungs. By day 14 postinjection, gross lung metastases in nu/nu or nu/+ mice differed significantly; nu/nu averaged only 2 ± 1 nodules, whereas nu/+ averaged 12 ± 3 nodules. In another experiment, 1 day before tumor cell injection, nu/nu and nu/+ mice were injected iv with 1 X 10^7 non-glass-adherent nu/+ lymphocytes. Twenty-four hours later groups of 10 lymphocyte-treated and non-lympocyte-treated nu/nu/ and nu/+ mice were injected with viable B16 cells. None of the nu/+ mice had visible tumors 16 days after implantation, but 8/10 non-lymphocyte-treated and 1/9 lymphocyte-treated nu/nu mice had palpable tumors. In the lymphocyte-treated nu/nu mice, the initial arrest of B16 cells were significantly greater, but the growth of these tumor cells in the lungs was not enhanced. It is suggested that nonimmunological factors are responsible for the poor growth of hematogenously disseminated allogeneic tumor cells in nu/nu mice. (19 references)

6924 PREFERENTIAL LOCALIZATION AND RATE OF LOSS OF LABELED ALLOANTIBODY FROM RAT TUMORS AND SKIN TRANSPLANTS CARRYING THE CORRESPONDING ALLOANTIGEN.

(Eng.) Izzo, M. J. (Dept. Radiation Biology and Biophysics, Univ. Rochester Sch. Medicine and Dentistry, Rochester, NY 14642); Bale, W. F. *Cancer Res* 36(8): 2868-2873; 1976.

Buffalo rats were immunized with a transplantable fibrosarcoma induced by methylcholanthrene in a Fischer 344 rat, and ^{125}I-labeled rat histocompatibility antibody was prepared from the Buffalo rat sera. After iv injection this antibody localized with high specificity in transplants of a second Fischer 344 tumor or in Fischer 344 skin grafts onto immunosuppressed Buffalo rats. In these conditions, only the tumor or skin grafts carried the corresponding antigen. In skin transplants localization at 24 hr corresponded to 80% and in tumor to 30% of the injected dose in tissue equal to 1% of the rat weight. However, rapid loss of the ^{125}I label from the target tissues indicated that degradation of antibody fixed to target cells was rapid and that the half-time of the intact antibody was less than 2 days. (23 references)

6925 STIMULATION OF HUMORAL IMMUNITY TO SURFACE ANTIGENS OF LEUKEMIC CELLS WITH INTERFERON-CONTAINING SERUM.

(Rus.) Skurkovich, S. V. (Central Inst. Hematology and Blood Transfusion, Moscow, USSR); Klinova, E. G.; Eremkina, E. I. *Biull Eksp Biol Med* 81(3): 358-360; 1976.

C57BL/6 mice were immunized with leukemic cells L-1210; (CBA x C57BL/6)F_1 mice were immunized with leukemic cells L-1210 and P-388. These animals were injected ip for 8 days (including the day of immunization) with 0.4 ml each of allogeneic or syngeneic interferon-containing serum. Control mice received the same amount of normal serum from the intact mice. The interferon-containing serum was obtained from the (CBA x C57BL/6)F_1 mice 24 hr after the ip injection of 2 mg of tilorone hydrochloride. Some of the samples of the interferon-containing serum were subjected to 48-hr dialysis against physiological saline. The interferon titer in the serum was 512-1500 U/ml. The sera from mice were tested in the microcytotoxicity test against cells 9-10 days after the immunization. The cytotoxic activity of the sera from mice given the interferon-containing serum was stimulated markedly. Syngeneic interferon-containing serum caused a more pronounced immunity-stimulating effect than allogeneic serum. (20 references)

6926 CHARACTERIZATION OF TUMOR-ASSOCIATED ANTIGENS OF OVARIAN CARCINOMA. (Eng.) Knauf, S. (Dept. Obstetrics and Gynecology, Univ. Toronto, Wellesley Hosp., Toronto, Ontario, Canada); Urbach, G. I. *Gynecol Oncol* 4(2): 167-175; 1976.

The distribution of four tumor-associated antigens of human ovarian carcinoma was studied by the immunoelectrophoresis of perchloric acid extracts of ovarian tumors with selected rabbit antitumor antisera. The tumor antigens were fractionated by chromatography on Sephadex G-200 and Sepharose 4B. Protein was eluted from the Sephadex G-200 columns in peaks I, II, and III at an elution volume/void volume (Ve/Vo) of 1.0, 1.7, and 3.0 and from Sepharose 4B columns in peaks IV, V, and VI at Ve/Vo of 1.0, 2.4, and 2.8 respectively. Peaks I, II, IV, and V had material that exhibited β-like mobility in immunoelectrophoretic analysis (barbital buffer, pH 8.6). Antigens exhibiting γ- and α-like mobility were eluted in peaks I, II, V, and VI and peaks II, III, and VI, respectively. The two β antigens were located at $Rf < 0.05$, in 5.6% SDS-acrylamide gels. Antigens with γ- and α-like mobility tentatively identified in 5.6% acrylamide gels at $Rf = 0.30$ to 0.42 and $Rf = 0.42$ to 0.46, with apparent molecular wts of $7\text{-}9 \times 10^4$ and $5.5\text{-}7 \times 10^4$ daltons, respectively. (17 references).

6927 INHIBITION OF HUMAN LYMPHOMA CELL-LINE COLONY FORMATION BY LYMPHOCYTES FROM PATIENTS WITH LYMPHOMA AND CANCER HOSPITAL EMPLOYEES. (Eng.) Drewinko, B. (Univ. Texas System Cancer Center, M. D. Anderson Hosp. and Tumor Inst., 6723 Bertner Ave., Houston, TX 77025); Mavligit, G. M.; Ambus, U.; Hersh, E. M. *Cancer* 37(6): 2929-2937; 1976.

Inhibition of human lymphoma cell line colony formation (ICF) was induced by peripheral blood lymphocytes (PBL) from patients with lymphoma and apparently healthy cancer hospital personnel. PBL from patients with nonlymphoma neoplasms and from normal blood bank donors did not elicit ICF. ICF was most marked when PBL were cocultivated for 24 hr in a ratio of 1,000:1 with target lymphoma cells cultured for 24 hr before exposure. There was no significant ICF when target cells were human neurogenic sarcoma, melanoma, colon adenocarcinoma, or Chinese hamster cells. It is suggested that ICF is elicited by PBL sensitized to a cross-reacting antigen present on the membrane of cultured lymphoma cells. This antigen may be synthesized by a transmissible etiologic factor. (55 references)

6928 IDENTIFICATION OF T CELL LYMPHOMA TUMOR ANTIGENS ON HUMAN T CELL LINES. (Eng.) Kaplan, J. (Children's Hosp. Michigan, 3901 Beaubien Blvd., Detroit MI 48201); Tilton, J.; Peterson, W. D. *Am J Hematol* 1(2): 219-223; 1976.

Since susceptibility to leukemia and outcome of the disease may be influenced by host tumor-specific immune responsiveness, human T cell lymphoma tumor antigens were studied. Rabbit antisera to T cell line HSB-2 were prepared, reactivity for histocompatibility antigens and normal T cells was removed by absorption with autocthonous B cell line CCRF-SB and normal thymocytes, and the absorbed antisera were tested by complement-dependent cytotoxicity against a panel of normal and malignant cells. A representative antiserum reacted with all four T cell lines (mean cytotoxic index = 56) and with tumor cells from patients with T cell lymphoma (mean cytotoxic index = 50) but did not react with tumor cells from six patients with other types of leukemias (mean cytotoxic index = 2), with three B cell lines (mean cytotoxic index = 1), normal peripheral blood lymphocytes (mean cytotoxic index = 5), or normal thymocytes (mean cytotoxic index = 6). It is concluded that appropriately absorbed antisera to human T cell lines detect T cell lymphomas tumor antigens. (8 references)

6929 THE ROLE OF THYMUS SUBPOPULATIONS IN ''T'' LEUKEMIA DEVELOPMENT. (Eng.) Chazan, R. (Dept. Chemical Immunology, Weizmann Inst. Science, Rehovot, Israel); Haran-Ghera, N. *Cell Immunol* 23(2): 356-375; 1976.

Antigenic properties of the cell surface of mouse thymocytes showed spontaneous (AKR mice) and induced (C57BL/6 mice) T leukemias to have the characteristics of the minor thymus subpopulations; namely, low levels of θ and high levels of H-2. Leukemogenic agents (fractionated irradiation or inoculation of radiation leukemia virus) induced a transient or permanent change in thymus population patterns. Within several weeks following leukemogenic treatment there was a relative enrichment of thymocytes (a) bearing low levels of θ and high levels of H-2, (b) partially resistant to hydrocortisone, and (c) capable of inducing a graft vs host response. Transplantation bioassays indicated the lack of demonstrable leukemic cells in the thymus within several weeks following the leukemogenic treatment. Similar spontaneous age-related changes in the pattern of the nonleukemic AKR thymus, namely, increase in the high H-2 thymus subpopulation and a gradual decrease in the percentage of θ-bearing cells, were observed from 5 mo onward. The relationship between the availability of certain thymus subpopulations and the ultimate overt development of leukemia was indicated. (32 references)

6930 TISSUE T AND B CELL INFILTRATION OF PRIMARY AND METASTATIC CANCER. (Eng.) Husby, G. (Dept. Medicine, Bernalillo County Medical Center, Univ. New Mexico, Sch. Medicine, Alburquerque, NM 87108); Hoagland, P. M.; Strickland, R. G.; Williams, R. C. *J Clin Invest* 57(6): 1471-1482; 1976.

Immunofluorescent techniques were used to identify the types of infiltrating lymphocytes adjacent to human malignant tumors. Twenty-four of 29 primary tumors and 5 of 8 metastatic lesions showed varying degrees of lymphocytic infiltration. T cells predominated in the infiltrates in primary tumors (means 80%, range 50%-100%), and this pattern was evident regardless of anatomic site or the presence or absence of metastatic spread. By contrast, B cells predominated at the margins of three of five tumor metastases. Mononuclear cells bearing the Fc receptor were not a prominent component of the infiltrates associated with either primary tumors or metastases, but tumor cell binding of fluoresceinated IgG aggregates occurred in 12 of 29 primary tumors. Peripheral blood T cell numbers were reduced significantly in a third of the patients. This decrease was not clearly related either to the extent of local tumor T cell infiltration or to the presence of disseminated disease. The results provide a descriptive analysis of the local and systemic distributions of immunocompetent cells in cancer. (54 references)

6931 LYMPHOCYTE RECEPTORS. I. RECEPTORS FOR FC OF IgG AND COMPLEMENT (C3B) ON IMMUNOGLOBULIN-BEARING, ANTIGEN-BINDING AND ANTIBODY-SECRETING CELLS. (Eng.) McConnell, I. (MRC Group on Mechanisms in Tumor Immunity, MRC Lab. Molecular Biology, Univ. Postgraduate Medical Sch., Hills Road, Cambridge CB2 2OH, England); Hurd, C. M. *Immunology* 30(6): 825-833; 1976.

Immunoglobulin-bearing, antigen-binding and antibody-secreting cells were investigated for the presence of membrane receptors for the Fc part of IgG and for C3b. There were Fc and C3b receptors on the surface of most Ig-bearing and antigen-binding cells. Fc receptors were also detected on IgM antibody-secreting cells but not on IgG-secreting cells. C3b receptors were not detected on any antibody-secreting cells. These receptors were either lost from the B cell surface as they differentiated into antibody-secreting cells or were blocked in vivo by immune complexes or C3b. (39 references)

6932 KINETICS OF SYNTHESIS AND IMMUNOLOGICALLY ACTIVE FRACTION OF ANTI-TUMOR IMMUNE RNA. (Eng.) Kern, D. H. (Dept. Surgery, Harbor General Hosp., Torrance, CA 90509); Chow, N.; Pilch, Y. H. *Cell Immunol* 24(1): 58-68; 1976.

The kinetics of synthesis of antitumor immune (RNA) (I-RNA) in immunized Hartley guinea pigs and Fischer rats was determined, and an immunologically active fraction of I-RNA was isolated. A microcytotoxicity assay for cell-mediated immunity showed that cytotoxic immune reactivity of syngeneic I-RNA was maximal when extracted from the spleens of the rats 21-28 days following their inoculation with 10^6 syngeneic MC3-R fibrosarcoma cells (from a Fischer 344/N rat). Maximum immunoreactivity of xenogeneic I-RNA from the lymphoid organs of guinea pigs immunized with MC-1 fibrosarcoma cells (from a C3Hf/HeCr mouse) was reached 14 days after immunization. Both syngeneic and xenogeneic antitumor I-RNA was fractionated in preparative sucrose density gradients. The highest cytotoxic immune reactivity was consistently obtained from I-RNA fractions with sedimentation values of 12S-16S. The immunologically active I-RNA comprised only 5%-7% of the total RNA extracted from the lymphoid tissues of immunized animals. (18 references)

6933 THYMUS AND TUMOR GROWTH: CONGENITALLY ATHYMIC (NUDE) MICE AS A NEW EXPERIMENTAL MODEL IN ONCOLOGY (Meeting Abstract). (Ger.) Krause, P.-H. (Medizinische Hochschule-MHH, Hanover, West Germany); Tizek, F.; Spath, B.; Schmitz, R.; Georgii, A. *Verh Dtsch Ges Pathol* (59): 486; 1975. (No references)

6934 INFLUENCE OF STRESS ON CANCER (Letter to Editor). (Eng.) Riley, V. (Dept. Microbiology, Pacific Northwest Res. Foundation, Seattle, WA 98104). *Science* 193(4247): 75; 1976.

6935 BIOLOGICAL ASPECTS OF PIGMENT CELLS AND MALIGNANT MELANOMA. (Eng.) Romsdahl, M. M.; Cox, I. S. *In: Neoplasms of the Skin and Malignant Melanoma. A Collection of Papers Presented at the Twentieth Annual Clinical Conference on Cancer, 1975, at The University of Texas System Cancer Center; M. D. Anderson Hospital and Tumor Institute, Houston, Texas.* (Chicago: Year Book Medical Publishers, Inc.): 251-277; 1976.

6936 IMMUNOLOGIC PARAMETERS OF ULTRAVIOLET CARCINOGENESIS. (Eng.) Kripke, M. L. (Basic Res. Program, Frederick Cancer Res. Center, P. O. Box B, Frederick, MD 21701); Fisher, M. S. *J Natl Cancer Inst* 57(1): 211-215; 1976.

6937 LOCAL ADOPTIVE TRANSFER OF ANTITUMOR CELLULAR IMMUNITY TO XENOGENEIC ANIMALS STUDIED WITH A RAPID RADIOISOTOPIC FOOTPAD ASSAY. (Eng.) Takeichi, N. (Cell Biology Section, Viral Biology Branch, NCI, NIH, Public Health Service, U.S. Dept. Health, Education, and Welfare, Bethesda, MD 20014); Economou, G. E.; Boone, C. W. *J Natl Cancer Inst* 57(1): 131-134; 1976.

6938 RESTORATION OF IMPAIRED IMMUNE FUNCTIONS IN AGING ANIMALS. I. EFFECT OF SYNGENEIC THYMUS AND BONE MARROW GRAFTS. (Eng.) Hirokawa, K. (Dept. Pathology, Sch. Medicine, Tokyo Medical and Dental Univ., Yushima, Bunkyo-ku, Tokyo, Japan); Albright, J. W.; Makinodan, T. *Clin Immunol Immunopathol* 5(3): 371-376; 1976.

6939 CELL-SPECIFIC DEFECT IN MONOCYTE FUNCTION DURING TUMOR GROWTH. (Eng.) Normann, S. J.

(Dept. Pathology, Coll. Medicine, Univ. Florida, Gainesville, FL 32610); Sorkin, E. *J Natl Cancer Inst* 57(1): 135-140; 1976.

6940 INHIBITION BY LYMPHOID CELLULAR FACTORS OF THE IMMUNOLOGICAL CYTOTOXICITY AGAINST A SYNGENEIC TUMOUR. (Eng.) LaFontaine, N. (Laboratoire d'Anatomie Pathologique, Institut de Pathologie, Universite de Liege au Sart-Tilman, 4000- Liege, Belgium); Firket, H. *Pathol Eur* 11(2): 147-150; 1976.

6941 IMMUNOSUPPRESSIVE EFFECT OF SOLUBLE EXTRACTS FROM HUMAN COLON CARCINOMAS (Meeting Abstract). (Fre.) Pommier, G. (Laboratoire d'Immunologie, 13385 Marseille Cedex 4, France); Remacle-Bonnet, M.; Depieds, R. *Ann Immunol (Paris)* 127C(2): 118; 1976. (No references)

6942 SUPPRESSION OF ANTIBODY RESPONSES IN ALLOGENEIC MICE BY PRODUCTS OF LYMPHOID TISSUE. I. ALLOGENEIC SUPPRESSIVE FACTOR (ASF) FROM SPLEENS REPOPULATED WITH THYMUS CELLS. (Eng.) Yonkosky, D. (Dept. Pathology, Boston Univ. Sch. Medicine, 80 East Concord St., Boston, MA 02118); Buffet, R. F.; Bennett, M. *J Immunol* 116(6): 1688-1694; 1976.

6943 SUPPRESSION OF ANTIBODY RESPONSES IN ALLOGENEIC MICE BY PRODUCTS OF LYMPHOID TISSUE. II. LACK OF ANTIGENIC SPECIFICITY AND IMMUNOGENETIC REQUIREMENTS OF ALLOGENEIC SUPPRESSIVE FACTOR (ASF). (Eng.) Yonkosky, D. (Dept. Pathology, Boston Univ. Sch. Medicine, Boston, MA 02118); Buffett, R. F.; Bennett, M. *J Immunol* 116(6): 1695-1703; 1976.

6944 CONDITIONS FAVORING IMMUNOLOGICAL ENHANCEMENT OF A MURINE ALLOGENEIC LYMPHOMA. (Eng.) Rumi, L. (Secion Leucemia Experimental, Instituto de Investigaciones Hematologicas, Academia Nacional de Medicina, Las Heras 3092, 1425 Buenos Aires, Argentina); Colmerauer, M. E.; Pasqualini, C. D. *Arch Geschwulstforsch* 46(6): 457-460; 1976.

6945 STUDIES ON THE ANTIGENIC DETERMINANTS OF THE THY-1.2 ALLOANTIGEN AS EXPRESSED BY THE MURINE LYMPHOBLASTOID LINE S-49.1 TB·2·. (Eng.) Johnson, B. J. (Dept. Microbiology, Univ. Alabama Medical Center, Birmingham, AL 35294); Kucich, U. N.; Maurelli, A. T. *J Immunol* 116(6): 1669-1671; 1976.

6946 AUTOIMMUNITY AND LYMPHOID MALIGNANCY IN NEW ZEALAND BLACK MICE. (Eng.) Talal, N.; Dauphinee, M.; Sugai, S. *In: Lymphocytes and Their Interactions.* Williams, R. C., ed. (New York: Raven Press): pp. 99-112; 1975. (26 references)

6947 MIXED LYMPHOCYTE REACTIONS: AUGMENTATION BY DRUGS THAT INHIBIT STIMULATOR CELL PROTEIN SYNTHESIS. (Eng.) Metzler, C. M. (Yale Univ. Sch. Medicine, Dept. Pathology, New Haven, CT 06510); Kostyk, T. G.; Gershon, R. K. *J Immunol* 117(4): 1295-1299; 1976.

6948 IN VITRO TOLERANCE INDUCTION OF NEONATAL MURINE B CELLS. (Eng.) Metcalf, E. S. (Dept. Pathology, Sch. Medicine, Univ. Pennsylvania, Philadelphia, PA 19174); Klinman, N. R. *J Exp Med* 143(6): 1327-1340; 1976.

6949 DEVELOPMENT OF B-LYMPHOCYTE COLONY-FORMING CELLS IN FOETAL MOUSE TISSUES. (Eng.) Johnson, G. R. (Walter and Eliza Hall Inst. Medical Res., Royal Melbourne Hosp. Post Office 3050, Victoria, Australia); Metcalf, D.; Wilson, J. W. *Immunology* 30(6): 907-914; 1976.

6950 CONTROL OF NORMAL CELL DIFFERENTIATION IN LEUKEMIC CELLS. (Eng.) Sachs, L. (Dept. Genetics, Weizmann Inst. Science, Rehovot, Israel). *Bibl Haematol* (43): 6-9; 1976. (17 references)

6951 VARIABLE REGION (FV) DETERMINANTS ON MOUSE LYMPHOCYTES. (Eng.) McConnell, I. (MRC Group on Mechanisms in Tumour Immunity, MRC Lab. Molecular Biology, Univ. Postgraduate Medical Sch., Hills Road, Cambridge CB2 20H, England); Lachmann, P. J.; Givol, D. *Immunology* 30(6): 841-850; 1976.

6952 PERSISTENCE OF IMMUNOGLOBULIN AND COMPLEMENT COMPONENTS C4 AND C3 BOUND TO GUINEA PIG TUMOR CELLS. (Eng.) Segerling, M. (Ruhr-Universitaet Bochum, West Germany); Ohanian, S. H.; Borsos, T. *J Natl Cancer Inst* 57(1): 145-150; 1976.

6953 THE SPECIFICITY OF THE Fc RECEPTOR ON MURINE LYMPHOCYTES FOR IMMUNOGLOBULINS OF THE IgG and IgM CLASSES. (Eng.) Ramasamy, R. (Dept. Immunology, A.R.C. Inst. Animal Physiology, Babraham, Cambridge CB2 4AT, England); Richardson, N. E.; Feinstein, A. *Immunology* 30(6): 851-858; 1976.

6954 RECEPTORS FOR IMMUNE COMPLEXES ON CELLS WITHIN A NON-LYMPHOID MURINE TUMOR. (Eng.) Braslawsky, G. R. (Dept. Microbiology, George S. Wise Center Life Sciences, Tel Aviv Univ., Tel Aviv, Israel); Yaackubowicz, M.; Frensdorff, A.; Witz, I. P. *J Immunol* 116(6): 1571-1578; 1976.

6955 AGGLUTINATION OF A TRANSFORMED MOUSE CELL LINE AND A VARIANT SUBLINE WITH CONCANAVALIN A: EFFECT OF TEMPERATURE AND TIME OF LECTIN INCUBATION. (Eng.) Rittenhouse, H. G. (Molecular Biology Inst., Univ. California, Los Angeles, CA 90024); Williams, R. E.; Fox, C. F. *Biochem Biophys Res Commun* 71(4): 975-983; 1976.

See also:

* (Rev): 6620, 6621, 6626, 6627, 6628, 6630, 6633, 6638, 6648, 6649, 6651, 6652, 6658
* (Viral): 6832, 6843, 6845, 6847, 6848, 6850, 6853, 6859, 6872, 6875, 6885, 6905, 6914, 6915
* (Path): 6956, 6957, 6975, 6996, 6997, 6999, 7073, 7077, 7079, 7080, 7091
* (Epid-Biom): 7108

6956 THE NEPHROTIC SYNDROME ASSOCIATED WITH NEOPLASIA: AN UNUSUAL PARANEOPLASTIC SYNDROME: REPORT OF A CASE AND REVIEW OF THE LITERATURE. (Eng.) Gagliano, R. G. (Div. Hematology-Oncology, Dept. Internal Medicine, Univ. Texas Medical Branch, Galveston, TX 77550); Costanzi, J. J.; Beathard, G. A.; Sarles, H. E.; Bell, J. D. *Am J Med* 60(7): 1026-1031; 1976.

A case of diffuse, well-differentiated, lymphocytic lymphoma and lipoid nephrosis documented by light microscopy, electron microscopy, and immunofluorescent studies is reported. A review of the literature revealed 76 case reports in which the nephrotic syndrome was associated with neoplasia. The most frequently associated neoplasms were Hodgkin's disease, various carcinomas, non Hodgkin's lymphoma, and leukemia, in descending order. The most frequent renal lesion in patients with the nephrotic syndrome associated with various carcinomas was membranous glomerulonephritis (81%) as opposed to patients with lymphomas or leukemias who had predominantly lipoid nephrosis (60%). The lesions in membranous nephropathy may be immunologically mediated by tumor or viral antigen-antibody complexes; those in lipoid nephrosis may be medicated by a defect in T lymphocyte function. (75 references)

6957 NONMALIGNANT MONOCLONAL IMMUNOGLOBULINEMIA, PERNICIOUS ANEMIA AND GASTRIC CARCINOMA. A MODEL OF IMMUNOLOGIC DYSFUNCTION. REPORT OF TWO CASES AND REVIEW OF THE LITERATURE. (Eng.) Burnier, E. (Clinique Medicale Therapeutique, Dept. Medicine, Univ. Geneva Medical Sch., Hopital Cantonal, Geneva, Switzerland); Swahlen, A.; Cruchaud, A. *Am J Med* 60(7): 1019-1025; 1976.

Two patients with monoclonal immunoglobulin A (lgA) and M (lgM) gammopathy, respectively, were studied in whom pernicious anemia and finally gastric carcinoma developed. One patient had autoantibodies to both gastric parietal cells and to thyroid microsomal antigen that could not be identified with the M component. This observation, plus the fact that pernicious anemia occurred in one case before and in the other case after the discovery of the M component, suggests that different clones of cells were responsible for both disorders. (53 references)

6958 APLASTIC ANEMIA AND THYMOMA. (Ger.) Grips, K. H. (Medizinische Universitaetsklinik, 5300 Bonn 1, Venusberg, West Germany); Ochs, H.; Otten, H.; Labedzki, L.; Tantow, J. *Dtsch Med Wochenschr* 101(38): 1389-1392; 1976.

The case history of 49-yr-old woman presenting radiologically with a partially calcified, space-filling, but tumor-free shadow in the anterior superior mediastinum, mitral deficit, and normochromic anemia is discussed. A sternal puncture smear was cell-rich but free of erythropoietic elements. Death occurred from cardiac insufficiency and circulatory failure. Autopsy found a mediastinal encapsulated connective tissue mass whose histology was spindle-cell with a small number of lymphocytic and epithelial elements. Thymoma was the diagnosis. The erythropoietin level was elevated maximally, but the erythropoietic-inhibiting factor was unknown. An autoimmune attack against erythropoiesis and the thymus is conceivable. (30 references)

6959 RELATIONSHIPS BETWEEN HEMOPOIESIS AND PERIPHERAL BLOOD COUNTS IN UNTREATED AND ^{32}P-TREATED PATIENTS WITH POLYCYTHEMIA VERA. (Ger.) Hauswaldt, C. (Medizinische Universitaets-Klinik, Humboldt-Allee 1, D-3400 Gottingen, West Germany); Schroeter, C. *Klin Wochenschr* 54(17): 823-826; 1976.

The histomorphometry of bone marrow cells in 66 polycythemia vera (PV) patients was analyzed and related to peripheral cells. The PV cases included 24 untreated patients, 27 under ^{32}P management for recurrence, and 15 with splenomegaly, some of whom were treated. Hemopoiesis was determined from iliac spine punctures. The difference in erythrocyte and granulocyte increase was not significant between the untreated and ^{32}P treated cases. Thrombocytes, granulocytes, and band forms were somewhat higher in the splenomegaly patients. Fatty tissue was less than expected in hemopoietic hyperplasia. The increase in hemopoietic elements was a function of erythropoietic hyperplasia (the erythrocyte: granulocyte ratio was less in the control group). Thrombopoiesis was three times the norm. Significant correlations were obtaine between hemopoietic composition and cell count for thrombocytes and erythrocytes pre- and posttreatment. The absence of a granulocyte correlation could not be explained. The sinusoids, predominantly venous, decreased in number with increasing hemopoiesis, after prior dilatation during initial hemopoiesis. There were neither positive nor negative correlations between proliferating erythrocytes, thrombocytes, and granulocytes in either the marrow or the circulation. (17 references)

6960 NON-RANDOM CHROMOSOME CHANGES IN ACUTE MYELOID LEUKEMIA. CHROMOSOME BANDING EXAMINATION OF 30 CASES AT DIAGNOSIS. (Eng.) Mitleman, F. (Dept. Clinical Genetics, Univ. Hosp., S-221 85 Lund, Sweden); Nilsson, P. G.; Levan, G.; Brandt, L. *Int J Cancer* 18(1): 31-38; 1976.

Bone-marrow chromosomes were examined with the G-banding technique at the time of diagnosis in 30 patients with acute myeloid leukemia. In 13/30 patients (43%) only normal diploid bone-marrow cells were found, and no deviations from the normal banding pattern were detected. In the bone-marrow cells of 17 patients (57%), distinct chromosome abnormalities were found; in 10 of the patients only abnormal cells were observed, whereas in 7 of the patients the abnormal cells coexisted with normal diploid cells without any visible chromosome banding abnormality. Detailed analysis of the karyotypic aberrations demonstrated that when they occurred they were clearly nonrandom. All patients except two displayed trisomy 8, 9, or 21 or monosomy 7. Analysis of acute leukemia cases from other laboratories indicated that the same pattern of chromosome involvement prevailed in them. (40 references)

6961 COMPARATIVE ELECTRON-MICROSCOPIC STUDY OF THE ERYTHROCYTIC LINE IN REFRACTORY ANEMIA (PRELEUKEMIA) AND MYELOMONOCYTIC LEUKEMIA. (Eng.) Maldonado, J. E. (Mayo Clinic, Rochester, NY 55901); Maigne, J.; Lecoq, D. *Blood Cells* 2(1/2): 167-185; 1976.

The bone marrow erythrocytic precursors of 12 patients with refractory anemia (preleukemia) or myelomonocytic leukemia were studied by transmission electron microscopy. The results were tabulated in a semiquantitative manner and the two main diagnostic groups were compared. Similar nuclear and cytoplasmic abnormalities of the normoblasts were observed in preleukemia and leukemia. A nuclear lesion consisting of nuclear clefts and blebs occurred in at least some of the normoblasts in all of the patients. This finding appears to be a new contribution in the field of preleukemia and myelomonocytic leukemia. Iron overload, including the presence of pathologic sideroblasts, was common to both preleukemia and leukemia. (18 references)

6962 ACUTE MYELOID LEUKEMIA APPEARING IN TWO PATIENTS AFTER PROLONGED CONTINUOUS CHLORAMBUCIL TREATMENT FOR WEGENER'S GRANULOMATOSIS. (Eng.) Westberg, N. G. (Dept. Nephrology Section, Medicine I, Sahlgrenska sjukhuset, S-413 45 Goteborg, Sweden); Swolin, B. *Acta Med Scand* 199(5): 373-377; 1976.

Two patients with Wegener's granulomatosis were treated with chlorambucil and prednisolone continuously for 3 and 5 yr, respectively. This treatment was effective in controlling the disease, but bone marrow toxicity with severe pancytopenia developed in both cases. Both patients died from thrombocytopenia with hemorrhagic pericarditis. In one case, a diagnosis of acute myeloid leukemia was established from the appearance of myeloblasts in the peripheral blood and from bone marrow morphology. In the other case this diagnosis was strongly suspected on the basis of the bone marrow morphology alone. It is suggested that this development of acute leukemia in two patients with a primary nonneoplastic disease indicates a direct carcinogenic action of chlorambucil in man. (37 references)

6963 LONG-TERM CYTOGENETIC STUDIES IN ACUTE LEUKEMIA OF CHILDREN; THE NATURE OF RELAPSE. (Eng.) Zuelzer, W. W. (Div. Blood Diseases and Resources Natl. Heart and Lung Inst., Bethesda, MD 20014; Inoue, S.; Thompson, R. I.; Ottenbreit, M. J. *Am J Hematol* 1(2): 143-190; 1976.

Sequential long-term cytogenetic studies were made in 71 children with acute leukemia to determine the nature of relapse after prolonged remission. In the majority of cases the findings suggested colonal identity of the leukemic cell population in relapse with that studied at onset of the disease, notwithstanding considerable karyotypic instability in almost half of the patients. An independent origin of the relapse clone could not be excluded on cytogenetic grounds in a small minority, but this was considered unlikely. The persistence of diploid leukemic cells in the presence of an aneuploid subclone was demonstrated in the relapse bone marrow, and/or spinal fluid in all the active phases. On this basis the conversion from an aneuploid to a predominantly or exclusively diploid karyotype could be visualized, and a new model of clonal evolution, involving repetitive formation of abnormal karyotypes from a surviving diploid clone, was suggested. (18 references)

6964 ANOTHER VARIANT TRANSLOCATION IN CHRONIC MYELOGENOUS LEUKEMIA--REVISITED (Letter to Editor). (Eng.) Rowley, J. D. (Univ. Chicago, Sch. Medicine, Chicago, IL); Wolman, S. R.; Horland, A. A. *N Engl J Med* 295(16): 900-901; 1976.

In 10/19 previously described cases of chronic myelogenous leukemia with unusual translocation, the rearrangement involved three chromosomes. In all cases with one possible exception two of the chromosomes were Nos. 9 and 22. Fluorescent banding and centromeric staining of cells from the patient thought to be the exception suggested a three-way translocation (4;9;22) (q23;q34;q11). This finding illustrates the importance of using multiple-staining techniques in the analysis of complex translocations. The results also show that the chromosomal events accompanying neoplasia are not random. Of 260 Philadelphia chromosome-positive patients with chronic myelogenous leukemia on whom banding was done, only 9 had a translocation from No. 22 that did not involve No. 9 either as the recipient chromosome or in a three-way translocation. (3 references)

6965 DE NOVO KAPOSI'S SARCOMA IN RENAL TRANSPLANTATION: CASE REPORT AND BRIEF REVIEW. (Eng.) Hardy, M. A. (Columbia Univ. Coll. Physicians and Surgeons, 630 West 168th St., New York City, NY 10031); Goldfarb, P.; Levine, S.; Dattner, A.; Muggia, F. M.; Levitt, S.; Weinstein, E. *Cancer* 38(1): 144-148; 1976.

A de novo development of Kaposi's sarcoma is described in a 48-yr-old man 9 mo after a cadaveric renal transplant. The disease progressed despite local irradiation, while the patient remained immunosuppressed with prednisone and azathioprine. This was accompanied by depressed immunologic tests. Discontinuation of azathioprine and addition of chemotherapy (bleomycin and vincristine), while continuing prednisone to maintain functional survival of the renal allograft, led to regression of extensive cutaneous lesions and suspected pulmonary Kaposi's sarcoma lesions. (23 references)

6966 THE HISTOGENESIS OF KAPOSI SARCOMA. A HISTOCHEMICAL AND ELECTRON-MICROSCOPIC STUDY. (Ger.) Braun-Falco, O. (Dermatologische Universitaetsklinik, D-8000 Munich 2, Frauenlobstr. 9, West Germany); Schmoeckel, Chr.; Huebner, G. *Virchows Arch (Pathol Anat)* 369(3): 215-227; 1976.

The histology and enzymology of three patients with Kaposi's sarcoma are presented. The patient ages ranged between 60 and 86 yr. Each presented with dark-red infiltrative tumors of the skin. The masses were formations of capillary-like structures, with or without lumina, and with poorly differentiated endothelial elements. The spindle-shaped tumor cells assumed endothelial configurations, with characteristic filament formation and abundant extravasated RBC. The presence of free fibroblast like cells, often devoid of endoplasmic reticulum, might derive from typical perithelial cells found in the capillary-like structures. Weibel-Palade bodies were identified in tumor cells of the skin and liver in two cases. The spindle and endothelial cells were rich in alkaline phosphatase and leucine aminopeptidase activity. (22 references)

6967 PECULIARITIES OF METASTASES OF SARCOMA 45 AND 536 IN DIFFERENT MODES OF TUMOUR INOCULATION. (Rus.) Shinkarenko, V. S. (Inst. General Pathology and Pathological Physiology, Acad. Medical Sciences USSR, Moscow, USSR). *Biull Eksp Biol Med* 81(3): 360-363; 1976.

Intratesticular inoculation in rats of 1 ml of sarcoma suspension was accompanied by a rapid growth of the tumor at inoculation site and the spread of the tumor nodes to the omentum majus, porta hepatis, mesentery, and the abdominal walls. After ip inoculation the spread of the tumor nodes was similar. The rats died in 13-15 days. One month after intratesticular inoculation of 0.2 ml of the tumor suspension lung metastases occurred in 74% of the animals with sarcoma-45 and in 90% of those with sarcoma-536. Tumor cells appeared in the bloodstream during the inoculation. However, lung metastases occurred only after the formation of a primary tumor node at the transplantation site. It is concluded that this system is a suitable experimental model for the study of the development of lung metastases in rats. (10 references)

6968 PRIMARY TRANSITIONAL CELL CARCINOMA OF THE FALLOPIAN TUBE ASSOCIATED WITH PRIMARY CARCINOMAS OF THE OVARY AND ENDOMETRIUM. (Eng.) Hovadhanakul, P. (Dept. Gynecology and Obstetrics, St. Louis Univ. Hosp., 1325 South Grand Blvd., St. Louis, MO 63104); Nuerenberger, S. P.; Ritter, P. J.; Taylor, H. B.; Cavanagh, D. *Gynecol Oncol* 4(2): 138-143; 1976.

The unique case of a 51-yr-old woman with primary cell carcinoma of the fallopian tube, primary endometrial adenocarcinoma, and primary endometrioid carcinoma of the ovary is reported. The clinical picture was similar to that of adenocarcinoma of the fallopian tube, but the mode of spread was somewhat different and more aggressive. The patient was treated with surgery and a combination of internal and external radiotherapy. The postoperative course was uneventful. (8 references)

6969 SIGNET-RING STROMAL TUMOR OF OVARY: HISTOCHEMICAL, LIGHT, AND ELECTRON MICROSCOPIC STUDY. (Eng.) Ramzy, T. (Dept. Pathology, Victoria Hosp., London, Ontario, Canada). *Cancer* 38(1): 166-172; 1976.

A peculiar case of primary ovarian neoplasm in a 28-yr-old woman is presented. The tumor cells showed extensive cytoplasmic vacuolation, resulting in a 'signet-ring' appearance similar to that in Krukenberg tumors. The tumor was studied histochemically and by light and electron microscopy. The cells appeared to be uniform. A moderately electron-dense flocculent material was present in the cytoplasmic vacuoles. Similar material was seen in the intercellular matrix with some fibrillary structures, suggesting a protein structure. This, coupled with the lack of any basement membrane material around the tumor cells, indicated a mesenchymal tumor probably derived from the multipotent ovarian stromal cell. Because of its gross and microscopic appearance, the tumor was believed to be benign. (13 references)

6970 VERRUCOUS CARCINOMA OF THE VAGINA. (Eng.) Ramzy, I. (Dept. Pathology, Victoria Hosp., London, Ontario, Canada); Smout, M. S.; Collins, J. A. *Am J Clin Pathol* 65(5): 644-653; 1976.

The features of verrucous carcinoma of the vagina are reviewed, and two new cases are presented: one in a 58-yr-old woman and one in a 53-yr-old woman. This neoplasm is characterized by a warty verrucous pattern of growth of the squamous epithelium. Histologically, this type of squamous-cell carcinoma is extremely well-differentiated, with minimal evidence of anaplasia of the cells. The neoplasm tends to grow slowly and to infiltrate, sometimes extensively, by pushing rather than by permeating the surrounding tissues. Surgical excision seems to provide the best cure at present, as the tumor does not respond to irradiation or to podophyllin treatment. Lymph-node dissection is not usually necessary in view of the tendency of the tumor to spread locally rather than to metastasize. However, the value of the resection of lymph nodes should be reassessed after enough cases have accumulated. (12 references)

6971 CARCINOSARCOMA OF THE BREAST. (Eng.) Philip, P. J. (Dept. Surgery, Univ. Dar-es-Salaam, Tanzania). *J R Coll Surg Edinb* 21(4): 229-232; 1976.

A case history of carcinosarcoma of the breast in a 28-yr-old nulliparous African woman is presented.

The patient presented with a painful mass in the breast of 6 mo duration. On a provisional diagnosis of carcinoma, the lump was excised; frozen sections showed squamous cell carcinoma of the breast. A modified radical mastectomy was performed followed by a course of radiotherapy. At the 6-mo follow-up, the patient was well. Microscopy showed an advanced and highly malignant neoplasm, with malignant activity in both the stromal and epithelial components of six areas examined. It appeared to have originated from a fibroadenoma of mixed intracanalicular and pericanalicular type, although the intracanalicular pattern of growth had been largely obliterated by active infiltration. The lymph nodes showed invasion by a solid epithelial tumor. Statistics of mammary carcinosarcoma arising from preexisting fibroadenoma and cystosarcoma phylloides reported in some small series in the literature are considered. (10 references)

6972 INTRACELLULAR MUCIN PRODUCTION BY LOBULAR BREAST CARCINOMA CELLS. (Eng.) Breslow, A. (George Washington Univ. Sch. Medicine, 2300 Eye St NW, Washington, DC 20037); Brancaccio, M. E. *Arch Pathol Lab Med* 100(11): 620-621; 1976.

Slides from 10 cases of pure infiltrating lobular carcinoma and 10 of in situ lobular breast cancer were studied with mucicarmine stain to determine the incidence of intracellular mucin. Photographs were taken from adjacent slides stained with hematoxylin-eosin because sufficient contrast could not be obtained with black and white photographs of mucicarmine-stained tissues. Nine of the infiltrating carcinomas and six of the in situ tumors contained mucicarminophilic cells. In most cases signet ring cells were seen in conjunction with the mucin-producing cells in the hematoxylin-eosin-stained material. None of the cases contained infiltrating duct carcinoma and none had in situ carcinoma of major ducts. The finding of positive cells in six cases of in situ lobular carcinoma is proof that lobular carcinoma cells can produce intracellular mucicarminophilic material in the absence of duct carcinoma. (4 references)

973 NEOPLASIA AT THE SITE OF URETEROSIGMOIDOSTOMY. (Eng.) Carswell, J. J. (Section rology, Medical Coll., Georgia Sch. Medicine, Augus- a, GA); Skeel, D. A.; Witherington, R.; Otken, L. . *J Urol* 115(6): 750-752; 1976.

he incidence of neoplasm is significantly increased n patients who have ureterosigmoidostomy. The mech- nism of induction of the cancers, at the site, is hought to be the action of urine on the colonic ucosa. A case history of a woman with this condi- ion is presented. The malignancy was transferred to he skin following a subsequent corrective operation. he patient was given chemotherapy but died after a elentless downhill course. The incidence of neoplas- ic changes appears to be directly related to the ge of the anastomosis. Therefore, it is urged that the operation be reserved for older aged patients. Alernative routes of ureter diversion should be considered in young patients. A system for complete and frequent follow-up of patients undergoing this procedure is presented. (11 references)

6974 TUMOR VIRULENCE AS A FUNCTION OF ULTRASTRUCTURAL MORPHOLOGY AND LYMPHATIC INVASION IN PATIENTS WITH SQUAMOUS CELL CARCINOMA OF THE CERVIX UTERI: A PRELIMINARY STUDY. (Eng.) Chen, S. S. (Dept. Obstetrics and Gynecology, State Univ. New York at Stony Brook, Stony Brook, NY 11794); Spiegelman, I.; Cohen, C. J. *Gynecol Oncol* 4(2): 194-203; 1976.

Ultrastructural tumor differences and their relationship to survival were studied in 20 patients with squamous cell carcinoma of the cervix, in conjunction with a 2-yr 1964-1966 radiosensitivity testing (RST) program. It included 10 patients with good responses and 10 with poor responses. Three classes were defined among the tumors. Class 1 tumors showed progressive differentiation toward the central zone from the proliferating zone; class 2 tumors had a moderately differentiated proliferatory zone with well-developed desmosomes and tonofilaments, and a central zone of differentiated cells mixed with degenerating cells; and class 3 tumors had a minimum variation of cells in both zones, and the desmosomes and tonofilaments were poorly developed. Classes 1 and 2 cancers were associated with good RST and class 3 cancer with poor RST. Patients with good RST response, class 1 or 2 cancer, and no lymphatic involvement had the best prognosis, whereas those with poor RST response, class 3 cancer, and positive lymphatic involvement had the poorest prognosis. The character of the tumor ultrastructure, radiation response, and demonstration of lymphatic invasion in the cervical biopsy were cardinal factors in predicting survival after adequate therapy. (13 references)

6975 CHARACTERIZATION AND LOCALIZATION OF CARCINOEMBRYONIC ANTIGEN IN A SQUAMOUS CELL CARCINOMA OF THE CERVIX. (Eng.) Goldenberg, D. M. (Dept. Pathology, Coll. Medicine, Univ. Kentucky Medical Center, Lexington, KY 40506); Pletsch, Q. Z.; Van Nagell, J. R. *Gynecol Oncol* 4(2): 204-211; 1976.

An immunological and physicochemical analysis was made of the carcinoembryonic antigen (CEA) of a 40-yr-old woman with squamous cell carcinoma of the cervix who had a plasma CEA titer of 28 μg/ml and a tumor CEA concentration of 900 μg/g. Immunodiffusion and immunoelectrophoresis showed that cervical cancer CEA is immunologically identical to colonic cancer CEA (used for comparison). However, cervical cancer CEA appeared in gel filtration to be 370,000 in molecular size, which is appreciably larger than the 200,000 size CEA usually found in colonic carcinomas. The CEA was localized by an immunoperoxidase reaction performed on paraffin sections of the tumor and was found to be present almost exclusively on the surface of the tumor cells. It is concluded that this immunocytochemical procedure for CEA detection and localization can be employed in the routine histopathological evaluation of such neoplastic tissues. (19 references)

6976 THE CERVICAL EPITHELIAL SURFACE. III. SCANNING ELECTRON MICROSCOPIC STUDY IN ATYPIAS AND INVASIVE CARCINOMA IN MICE.

(Eng.) Rubio, C. A. (Inst. Pathology, Karolinska sjukhuset, Sweden). *Acta Cytol (Baltimore)* 20(4): 375-380; 1976.

The anatomy of the epithelial surface of the uterine cervix was studied in 31 C57Bl mice by scanning electron microscopy (SEM). The cervices of 20 mice were painted twice a week for 5 mo with 3,4-benzpyrene (BP) in acetone and in 11 mice with acetone alone. Histologically, SEM showed that 15 mice had normal epithelium, 6 had atypia Grade I, 5 atypia Grade II, 1 atypia Grade III, and 4 had invasive carcinoma. Only 2/15 of the acetone- or BP-treated animals with normal epithelium showed similar structures to those described earlier for the normal cervical epithelium. The remaining 13 had regular mosaics and intermediate or cobblestone structures covered with irregular microvilli, with or without long, fingerlike protrusions. Irregular mosaics and intermediate or cobblestone structures were seen in atypical epithelium. In atypias Grade III and in invasive carcinoma irregular cobblestone structures with cellular overlapping were present. Atypical and invasive carcinomas were usually furnished with irregular microvilli, irregular fragmented microrugae, and fingerlike protrusions. The proportion of mice having anisovillosis with fingerlike protrusions increased with increasing degree of epithelial severity. Pathologic SEM changes occurred in some treated mice having normal histology, suggesting that alterations at the cellular membrane level may precede the nucleocytoplasmic changes required for the recognition of atypical epithelium in conventional histologic preparations. (15 references)

6977 GONADOBLASTOMA: HISTOLOGIC, ULTRASTRUCTURAL, AND HISTOCHEMICAL OBSERVATIONS IN FIVE CASES.

(Eng.) Garvin, A. J. (Dept. Pathology, Medical Univ. South Carolina, Charleston, SC 29401); Pratt-Thomas, H. R.; Spector, M.; Spicer, S. S.; Williamson, H. *Am J Obstet Gynecol* 125(4): 459-471; 1976.

Five cases of gonadoblastoma were studied by light and electron microscopy and histochemistry. The germ cells were the motivating force underlying either tumor proliferation or regression. The ultrastructural morphology confirmed the presence of undifferentiated gonadal cells with active steroid synthesis by the interstitial cells. The Call-Exner-like bodies that showed extensive calcification were composed of basement membrane material containing a sulfated mucosubstance. A histochemical comparison with the noncalcifying Call-Exner bodies of a granulosa-cell tumor showed that the Call-Exner bodies differed only in their glycoprotein content.The calcium deposits were identified as oriented hydroxyapatite crystals by electron diffraction, and it is proposed that the basement membrane material may serve as a nucleation site for calcification. High serum testosterone levels were correlated with the presence solely of interstitial cells in one case. The finding of a gonadoblastoma without the presence of a Y chromosome contradicts earlier proposals concerning the requirement of a Y chromosome for germ cell proliferation. (17 references)

6978 INCREASED SUSCEPTIBILITY OF MURINE TERATOCARCINOMA CELLS TO SIMIAN VIRUS 40 AND POLYOMA VIRUS FOLLOWING TREATMENT WITH 5-BROMODEOXYURIDINE.

(Eng.) Speers, W. C. (Dept. Pathology, Univ. Colorado Medical Sch., Denver Co 80220); Lehman, J. M. *J Cell Physiol* 88(3): 297-306; 1976.

Cultures of the multipotential stem cell, embryonal carcinoma, and several differentiated cells of a murine teratocarcinoma were treated with 5-bromodeoxyuridine (BUdR). At concentrations of 1-50 μg/ml of BUdR there was a marked change after 2-4 days in the morphology of the cells. For up to 4 days the BUdR-treated cultures had a growth potential similar to that of untreated cultures. When these BUdR-treated cells were infected with simian virus 40 and polyoma virus, there was an increase in susceptibili of the treated cells. The untreated embryonal carcinoma cells were refractory. These results suggest that BUdR modifies the embryonal carcinoma cells to allow infection with two DNA viruses. (16 references

6979 THYROID-BOUND Y-CHROMATIN-LIKE FLUORESCENCE IN THE NUCLEI OF THYROID ADENOMAS.

(Eng.) Sellyei, M. (Robert Karoly Hosp., Budapest, Hungary); Krausz, T.; Vass, L. *Arch Geschwulstforsc* 46(3): 204-209; 1976.

Brilliantly fluorescent supernumerary chromocenters indistinguishable from the Y-chromatin have often been found in thyroid nuclei. The occurrence of thi Y-chromatin like fluorescence in 31 thyroid adenoma obtained from 30 autopsy cases (10 males, 20 female was compared with nonadenomatous thyroid tissues of the same cases 4 to 16 hr after death. Cytologic specimens (smears and slides made of cell suspensions) were classified into three groups, negative, slightly elevated, and elevated, according to the frequency of nuclei with Y-chromatin-like chromocenters. All adenomas had a follicular structure except for one with a papillary structure. The number of Y-chromatin-like chromocenters was lower in the adenomas (15/31) than in the corresponding nonadenomatous tissue. The Y-chromatin-like flu rescence had a negative count in 13 of the adenomas but in only 3 samples of the normal thyroid tissues The disappearance of the nuclei with Y-chromatin-li chromocenters is supposedly connected with cellular dedifferentiation of thyroid adenomas. (9 reference

6980 FINE STRUCTURE OF A DIFFUSE UNDIFFERENTIATED SMALL-CELL CARCINOMA OF THE THYROI

(Eng.) Saito, R. (Clinical Lab., Veterans Admin.

Hosp., Univ. Drive C, Pittsburgh, PA 15240); Sharma, K. *Am J Clin Pathol* 65(5): 623-630; 1976.

A case of small-cell carcinoma in a 39-yr-old man was studied by electron microscopy. Ultrastructurally, the tumor was composed of cells possessing occasional intercellular junctional complexes and spaces with microvilli. There were abundant free ribosomes and a well-developed rough endoplasmic reticulum in the cytoplasm. Golgi apparatus, smooth endoplasmic reticulum, membrane-bound cytosomes, and centrioles were also evident. Numerous swollen mitochondria were seen in some tumor cells. A few large tumor cells characterized by abundant cytoplasm containing few mitochondria, endoplasmic reticulum, and numerous microfibrils were also observed. A few collagen fibers, lymphocytes, and plasma cells were present among tumor cells. No basement membranes nor virus-like particles were seen. The case illustrates the value of electron microscopy in the differentiation of diffuse, undifferentiated, small-cell carcinoma of the thyroid from lymphoma. (16 references)

6981 CHOROIDAL LEIOMYOMA OF VASCULAR ORIGIN. (Eng.) Jakobiec, F. A. (Registry Ophthalmic Pathology, Armed Forces Inst. Pathology, Washington, DC 20306); Witschel, H.; Zimmerman, L. E. *Am J Ophthalmol* 82(2): 205-212; 1976.

A unique case of choroidal leiomyoma is reported in a 57-yr-old man with a clinically suspected malignant melanoma of the left eye. Light microscopy showed that the enucleated eye harbored an unusual choroidal tumor that had extended extraocularly. Electron microscopy of the deparaffinized tissue established the smooth muscle nature of the tumor cells as well as the presence of numerous pericytes associated with conspicuous vascular channels. This unique myogenous tumor of the choroid probably had a vascular origin. (22 references)

6982 ABNORMAL MITOCHONDRIA IN RETINOBLASTOMA. (Eng.) Sun, C. N. (Veterans Admin. Hosp., Little Rock, AR 72206). *Experientia* 32(5): 630-632; 1976.

Six retinoblastoma tumor specimens from a family of three children were examined. Bizzare mitochondria, including irregular forms with focal expansion and constrictions were often found. Occasionally, a portion of the mitochondria formed rings. Branching mitochondria were also seen. Other striking features of the mitochondria from tumor cells were the alteration of cristae and occasional presence of dense bodies. Morphological modifications of the mitochondria may have resulted from the pathological conditions of the tumor cells. (8 references)

6983 DELAYED MUTATION AS A CAUSE OF RETINOBLASTOMA: APPLICATION TO GENETIC COUNSELING. (Eng.) Herrmann, J. (Univ. Wisconsin Genetics Lab., Univ. Wisconsin, Madison, WI). *Birth Defects: Orig Artic Ser* 12(1): 79-90; 1976.

The genealogic and genetic data on retinoblastoma were reviewed and interpreted according to the model of delayed mutation and applied to specific situations in genetic counseling. Patients with multiple congenital abnormalities and systemic chromosome aberrations are regarded as belonging to a different category of retinoblastoma cases than the more common patients without these abnormalities. The model of delayed mutation is considered for the latter group of patients. According to the model, mutation at the retinoblastoma locus can be delayed or complete and can occur during meiotic or mitotic cell division. Genotypically, only three classes can be identified in retinoblastoma families: homozygous normal, heterozygous for the premutated allele, and heterozygous for the (fully) mutated allele. There is no evidence to suggest incomplete penetrance of the mutant allele, but 14% of individuals with the mutant gene are unilaterally affected. Carriers produce normal, affected, and carrier offspring in the empiric proportion of, respectively, 54.5%, 36.4%, and 9.1%. Most difficulties in genetic counseling arise because affected individuals may have inherited the premutated or the mutated allele and because unaffected individuals may have inherited the normal or the premutated allele. These aspects were considered for individuals presenting as sporadic-unilateral, sporadic-bilateral, familial-unilateral, and familial-bilateral cases. (33 references)

6984 ULTRASTRUCTURE OF THE ESTHESIONEUROBLASTOMA. (Eng.) Osamura, R. Y. (Dept. Pathology, Henry Ford Hosp., Detroit, MI); Fine, G. *Cancer* 38(1): 173-179; 1976.

A tumor, in a 66-yr-old woman, with the light microscopic appearance of an esthesioneuroblastoma and in the proper anatomic location was examined by electron microscopy. Secretory-type granules, cytoplasmic fibrils, and microtubules similar to those described in neuroblastomas were found in many of the tumor cells, supporting an origin from the sympathetic autonomic nervous system. Similar organelles were found in three other nasal tumors considered to be esthesioneuroblastomas, but their detail was obscured because they were examined after they had been processed in paraffin. (26 references).

6985 VARIABLY DIFFERENTIATING ORAL NEOPLASMS, RANGING FROM EPIDERMAL PAPILLOMA TO ODONTOGENIC AMELOBLASTOMA, IN CUNNERS [*(TAUTOGOLABRUS ADSPERSUS)* OSTEICHTHYES; PERCIFORMES: LABRIDAE]. (Eng.) Harshbarger, J. C. (Registry Tumors Lower Animals, Museum Natural History, Smithsonian Institution, Washington, DC 20560); Shumway, S. E.; Bane, G. W. *Prog Exp Tumor Res* 20: 113-128; 1976.

Six case histories are presented of odontogenic neoplasms in cunners, an omnivorous coastal fish ranging from Newfoundland to Virginia. Nine of 500 (1.8%) cunners examined had abnormal growths protruding from the mouth. Four of the nine growths were examined histologically, and all four were found to be neoplasms. Three additional cunners with oral protrusions were collected from the same area and examined histologically: two of the lesions were neoplastic and the third was parasitic. Each case shows a limited range of morphologic variation and, as a group, the cases illustrate a spectrum of differentiation in oral neoplasms ranging from no differentiation of tooth tissues to differentiation of all tooth elements. The cause of these tumors is unknown, but a combination of factors is probably involved. Cunner feed on the bottom where chemical and viral carcinogens probably accumulate. Their diet consists of abrasive types of food that could injure the mouth area and allow intimate contact with carcinogenic agents that might be present. The point of the abrasion is probably the site for tumor development, which would explain why the growths occurred on either jaw and arose from both lips and oral mucosa. The fact that cunners seem to be quite sensitive to some agent(s) that can induce tumors suggests that they may be useful in developing a model for studying neoplasms of dental origin. (27 references)

6986 ULTRASTRUCTURAL STUDY OF AN ODONTOGENIC MYXOMA. (Eng.) Goldblatt, L. I. (Dept. Oral Pathology, Indiana Univ. Sch. Dentistry, Indianapolis, IN 46202). *Oral Surg* 42(2): 206-220; 1976.

An odontogenic myxoma from a 26-yr-old Caucasian woman was studied by electron microscopy. Two basic types of tumor cells were found: secretory and nonsecretory. The secretory cell type was the principal tumor cell and resembled the fibroblast in many respects. Although the ultrastructural findings indicated an abortive attempt at collagen fibrillogenesis, there was at the same time prominent secretory activity within the tumor cells, resulting in the excessive production of an acid mucopolysaccharide matrix. Phagocytosis by tumor cells of residual collagen in the area also occurred. Although the ultrastructural findings are compatible with an odontogenic origin, they are also compatible with an origin from primitive nonodontogenic mesenchymal rests. (48 references)

6987 THE SURFACE OF NASAL POLYPS IN THE SCANNING ELECTRON MICROSCOPE. (Ger.) Lenz, H. (Wurzburg, West Germany). *Arch Otorhinolaryngol (NY)* 210(2): 255-257; 1975.

The cortical structure of the endonasal polyps in 11 patients was explored by electron microscopy. There was a predominance of kinocilia-free epithelium with the following properties: loose cylindrical epithelium with wide intercellular spaces and differently sized cells, transitional forms from cuboidal cells with apical hypertrophy to squamous cells, cytoplasmic protuberances typical of apocrine secretion, goblet cells with minimal microvilli, and degenerating cylindrical cells. The cells possessing kinocilia had not only the usual patterns of clus tered, directional cilia but also long, thin, intertwined cilia with coordinated directional orientation and negligible signs of secretory involvement. The predominance of kinocilia-free epithelialization and nonfunctional ciliated area suggests a disturbed mucociliary mechanism. (No references)

6988 MUCOEPIDERMOID TUMORS OF THE BRONCHI. (Rus.) Dvorakovskaia, I. V. (All-Union Scientific Res. Inst. Pulmonology, Ministry of Health USSR, Leningrad, USSR). *Arkh Patol* 38: 52-57; 1976.

A total of 14 patients, 29-75 yr of age, with mucoepidermoid tumors of the bronchi was studied. Nine tumors were exophytic, three endobronchial, and two of the 'Iceberg' type. A definite interdependence was observed between the anatomic form of the tumors and their histological structure. All the variants of the multistratified structures (pseudoepidermoid, spindle-cellular, clear-cellular, and others) were characterized by the absence of cornification. In mucigenesis there was no observed metaplasia, but maturation of cells in the direction natural for the respiratory epithelium. Mucigenesis could be realized in two ways: in glandular tubes or by mucification of individual cells of pseudoepidermoid layers. In the latter case the polar differentiation of cells was absent. Mucoepidermoid tumors may develop both from mucous glands and from tegmental epithelium of the bronchi. (17 references)

6989 INVESTIGATION OF THE SURFACE STRUCTURE OF NORMAL PRECANCEROUS AND CANCEROUS EPITHELIUM OF HUMAN VOCAL CORDS BY SCANNING ELECTRON MICROSCOPY. (Ger.) Juraske, P. (Frankfurt am Main, West Germany). Arnold, W.; Wetzstein, R. *Arch Otorhinolaryngol (NY)* 210(2): 243; 1975.

The regular pavement structure of epithelial cell assembly in normal human vocal cords is lost in carcinoma. The cells are no longer uniformly flat and polygonal, but assume different dimensions with irregular surfaces. The normally narrow intercellular spaces are widened, and the desmosomal bonds disintegrate. Wherever the carcinoma has infiltrated subepithelially, the normal epithelial environment begins to show irregular, loose strands, with hypertropic cells, some of which are clustered into islets This picture might be typical of so called pericarcinomatous epithelium, but it is not characteristic of carcinoma in-situ. (No references)

6990 GRANULAR CELL TUMORS OF THE LARYNX. (Eng.) Coates, H. L. (Mayo Clinic and Mayo Foundation, Rochester, MN); McDonald, T. J.; Devine, K. D.; Weiland, L. H. *Ann Otol Rhinol Laryngol* 85(4): 504-507; 1976.

Current concepts of the histogenesis of granular cell tumors of the larynx are reviewed, and 12 new cases are presented. These tumors are relatively uncommon, always benign, and most often located in the posterior portion of the larynx. They are easily identified and should be differentiated from other lesions. A possible problem in the differential diagnosis is the presence of pseudoepitheliomatous hyperplasia, which overlies the granular cell tumor and which may mimic squamous cell carcinoma. Careful histopathologic differentiation is important because the laryngeal granular cell lesion should be managed conservatively, with transoral local excision usually being adequate. The histogenesis of these lesions remains in doubt, with a neural or epithelial derivation being the most likely possibility. Of the 12 cases presented, all had smoked the equivalent of one or more packages of cigarettes a day, and 2 cases had coexisting squamous cell carcinoma and presented with pain and hemoptysis. (14 references)

6991 FIBROELASTIC HAMARTOMA (FIBROMA) OF THE HEART. (Eng.) Feldman, P. S. (Dept. Pathology, Univ. Hosp., 225 W. Dickinson, San Diego, CA 92103); Meyer, M. W. *Cancer* 38(1): 314-323; 1976.

A successfully excised cardiac fibroma (fibroelastic hamartoma) was studied by light and electron microscopy. The tumor was composed mainly of fibroblasts admixed with bundles of collagen and elastic fibers. No muscle fibers were demonstrated in the central region of the tumor either by light or electron microscopy. Mast cells were occasionally present. The lack of encapsulation enabled fibroblasts with collagen and elastic fibers to extend between groups of myocardial fibers at the periphery of the tumor. Within these myocardial fibers ultrastructural changes were limited to the mitochondria and myofibrillar structure. (27 references)

6992 HERPESVIRUS IN BLADDER CANCER. (Eng.) Murphy, W. M. (Dept. Pathology, Univ. Tennessee Center Health Sciences, Memphis TN 38163). *Acta Cytol (Baltimore)* 20(3): 207-210; 1976.

The case of an 82-yr-old woman with a case of squamous cell carcinoma of the urinary bladder is reported in which herpesvirus virions could be identified by electron microscopy. The value of cytology in the recognition of the typical intranuclear inclusions that led to further studies is emphasized. Although previous reports have emphasized the association of herpes simplex and uterine cervical carcinoma, other combinations, especially with neoplasms of squamous cell type, have been reported. (24 references)

6993 FIFTY-THREE MONTH PERSISTENCE OF RING CHROMOSOME IN NONINVASIVE BLADDER CARCINOMA. (Eng.) Falor, W. H. (Lymph Res. Lab., Akron City Hosp., Akron OH 44309); Ward, R. M. *Acta Cytol (Baltimore)* 20(3): 272-275; 1976.

A recurrent noninvasive papillary carcinoma of the bladder in a 59-yr-old caucasian man was studied by direct cytogenetic analysis of two cystoscopic biopsies obtained 53 mo apart. Persistent similar karyotypic abnormalities, including aneuploidy and ring and other marker chromosomes, the hallmarks of invasive cancer, were present in both specimens. In the earlier specimen, DNA banding was identified in 35% of the metaphases and in 56% of the karyotypes. The continuing abnormal chromosomal silhouette of this tumor supported the stemline cell concept for malignancies, even when applied to such relatively benign neoplasms as this noninvasive carcinoma of the bladder.

6994 PROLIFERATION AND PRODUCTION OF HEMOPOIETIC CELLS IN TWO STAGES OF DISEASE: PRELEUKEMIA AND LEUKEMIA. (Eng.) Doermer, P. (Institut fuer Haematologie der Gesellschaft fuer Strahlen- und Umweltforschung, Landwehrstr. 61, D-8000 Muenchen 2, West Germany); Hegemann, F.; Brinkmann, W. *Klin Wochenschr* 54(10): 461-466; 1976.

The kinetics of erythropoietic and granulocytopoietic cell proliferation were investigated in a 72-yr-old at two distinct stages: in preleukemia presenting as pancytopenia with deficient erythropoiesis and 2 yr later in acute myelogenous leukemia. The DNA synthesis rate of individual cells was determined by quantitative ^{14}C-autoradiography after short-term incubation with ^{14}C-thymidine and fluorodeoxyuridine. Erythropoiesis was equally deficient in the two stages; however, the rate of proliferation slowed down toward the leukemic stage. The production rate of myeloblasts was markedly reduced in preleukemia, accompanied by a very low labeling index. In leukemia, on the other hand, the production rate was increased to such a degree that the leukemic myeloblast compartment can be considered as prevailingly self-reproductive. The proliferation rate of myeloblasts was reduced in preleukemia and there was a further decrease in leukemia. From a kinetic standpoint the manifestation of leukemia in this patient was explained best by a change in the mode of proliferation: the myeloblasts changed from steady state growth to behaving like an exponentially expanding population. (29 references)

6995 FURTHER CHARACTERIZATION OF THE CIRCULATING CELL IN CHRONIC LYMPHOCYTIC LEUKEMIA. (Eng.) Schultz, E. F. (Dept. Medicine, Coll. Medicine and Dentistry New Jersey, New Jersey Medical Sch., Newark, NJ); Davis, S.; Rubin, A. D. *Blood* 48(2): 223-234; 1976.

Peripheral lymphocytes from normal individuals and from patients with mild to moderate chronic lymphocytic leukemia (CLL) were cultured in vitro for 1-7 days. For experiments with Ig-bearing cells, patients with advanced cases were used. The growth response to phytohemagglutinin (PHA) was quantitated by the incorporation of ^{3}H-uridine into an RNA nucleotide during a 2-hr pulse with the radioisotope. The maximum response in PHA-stimulated normal cultures appeared at 2-3 days, but CLL cultures required 5-7 days to develop their maximal response, which was 50%-60% of the normal magnitude. Dilution of the number of normally reactive lymphocytes by culturing them with totally unreactive, mitomycin-treated cells produced a normal 72-hr maximal response, regardless of the proportion of unreactive cells in the PHA-stimulated cultures. With peripheral lymphocytes from patients with myeloblastic leukemia, in which large numbers of unreactive myeloblasts diluted the normal small lymphocytes, a depressed reaction occurred at the anticipated 2-3 days. Nylon fiber-adherent lymphocytes consisting of 85% Ig-bearing cells responded minimally to PHA, but showed no evidence of a delay. When isolated from CLL patients, both fiber adherent cells (Ig-bearing) as well as non-fiber-adherent (sheep RBC rosetting) cells responded to PHA in a delayed fashion. Similarly, a case of CLL, in which 93.5% of the circulating lymphocytes bore sheep RBC receptors, showed its peak response to PHA at 7 days. Therefore, with the use of surface marker criteria considered characteristic of normal T and B cells, the delayed response to PHA of CLL lymphocytes was independent of thymic or nonthymic origin. (28 references)

6996 RELATIONSHIP BETWEEN AGE AND THYMIC FUNCTION IN THE DEVELOPMENT OF LEUKEMIA IN AKR MICE. (Eng.) Gershwin, R. J. (Dept. Medicine, Univ. California Sch. Medicine, Davis, CA 95616); Gershwin, M. E.; Steinberg, A. D.; Ahmed, A.; Ochiai, T. *Proc Soc Exp Biol Med* 152(3): 403-407; 1976.

AKR mice develop spontaneous lymphocytic leukemia, and a characteristic latency period of 6 mo has been observed before the development of the leukemia. The role of the thymus and its relation to the age of these animals in disease development was investigated. There was no evidence to suggest an inherent resistance of young mice or young thymic cells to development of leukemia. Repetitive grafting of 4-wk thymic tissue into mice 8 wk or 6 mo old did not prolong survival. Mortality was accelerated by grafting 8-wk-old mice with 6-mo syngeneic thymic grafts. These results are contrary to the current hypothesis that the latent period for leukemia in AKR mice is produced by thymic suppressor cells in young mice. (22 references)

6997 HAIRY CELL LEUKEMIA. I. CLINICAL FEATURES, CYTOCHEMISTRY, PHAGOCYTOSIS, ESTABLISHMENT OF PERMANENT CELL LINES. (Ger.) Heyden, H. W. v. (Lehrstuhl Innere Medizin II, Medizinische Universitaetsklinik, 74 Tuebingen, Otfried-Mueller-Strasse, West Germany); Waller, H. D.; Pape, G. R.; Benohr, H. Chr.; Braun, H. J.; Wilms, K.; Rieber, E. P.; Riethmueller, G. *Dtsch Med Wochenschr* 101(1): 3-8; 1976.

The clinical course of hairy cell (HC) leukemia in seven patients is described from a cytoimmunological perspective. The disease was confirmed by negative tartrate inhibition of peripheral and marrow cell acid phosphatase (AP). All patients, 39-62 yr of age, presented with splenomegaly, five with hepatomegaly, four with lymph node enlargement, and four with petechiae. All were thrombocytopenic and most were anemic and leukocytopenic. HC distribution and complement were intractable to chemotherapy. HC was negative for peroxidase and naphthol-AS-D-chloroacetate esterase and weakly positive for α-naphthylacetate esterase. AP was either diffuse or discrete and was not inhibited by L(+)-tartrate. Alkaline phosphatase was negative in leukocytes and variously elevated in neutrophils. The phagocytic potential for India ink and latex particles was expressed in five cases, most prominently by tartrate-resistant cells. Immunoglobulins were not markedly different from normal, although the γ-globulins and γM-globulins fell transiently. Permanent cell lines were established from two patients. The positive phagocytic index and α-naphthylacetate esterase reaction, which were reproduced in the cell cultures, are typical properties of monocytes. Perhaps the HC is an undifferentiated cell with both monocytic and B lymphocytic properties. (36 references)

6998 TUBULAR INCLUSIONS IN THE LYMPHOCYTES IN A CASE OF HAIRY CELL LEUKEMIA. (Fre.) Turpin, F. (Laboratoire d'Hematologie, Hopital Franco-Musulman de Bobigny, Universite Paris XIII, 74, rue Marcel-Cachin, 93000 Bobigny, France); Lejeune, F.; Lortholary, P. *Pathol Biol (Paris)* 24(4): 287-292; 1976.

The cytochemical and ultrastructural characteristics of lymphocytes with Hovig type tubular inclusion bodies as observed in a case of hairy cell leukemia are described. The patient was a 50-yr-old woman initially hospitalized because of asthenia associated with pancytopenia. Splenomegaly was present. A diagnosis of hairy cell leukemia was based on biopsy of the bone marrow, which revealed medullary collagenous sclerosis and a proliferation of hairy cells. The patient was successfully treated with transfusions of WBC and splenectomy. Large azurophilic inclusion bodies were observed in the cytoplasm of the large- and medium-sized May-Grunwald Giemsa stained lymphocytes of the peripheral blood and spleen. Under phase-contrast microscopy, the inclusions appeared as large grains in the cytoplasm. Single large inclusion bodies composed of juxtaposed tubules surrounded by a membrane were seen in lymphocytes observed electron microscopically. The tubules were also seen in clusters in the cytoplasm or within a vacuole. Lymphocytes containing the tubules were otherwise normal. The tubular inclusions were not observed in the hairy cells or in spleen lymphocytes. The biochemical or functional nature of the inclusions is not known definitely, but theories on their origin are discussed. (30 references)

6999 STUDY OF THE NATURE OF ''HAIRY'' CELLS, WITH EMPHASIS ON ENZYMATIC MARKERS. (Eng.) Rozenszajn, L. A. (Clinical Labs., Meir Hosp., Kfar Saba, Israel); Gutman, A.; Radnay, J.; Ben David, E.; Shoham, D. *AM J Clin Pathol* 66(2): 432-441; 1976.

The peripheral blood, bone marrow, and spleen cells from three patients with hairy-cell leukemia were studied. Two of the three patients had well-organized cytoplasmic, ribosome-lamellar inclusions in their leukemic cells. Blast transformation and ^{3}H-thymidine incorporation of lymphocytes seemed to fall within normal ranges when the findings were related to the absolute numbers of lymphocytes. The enzymatic markers demonstrated in hairy cells--strong acid phosphatase activity in endoplasmic reticulum and lysosomes, marked α-naphthylacetate esterase reaction, and weak β-glucuronidase activity--as well as their phagocytosis of latex particles, indicated a common origin with monocytes or histiocytes. No decisive results were obtained by immunofluorescence. Evaluation of the significance of the formation by hairy cells of mouse RBC rosettes, as well as the presence of the typical hairlike projections, may require additional knowledge concerning the membrane of these cells. (No references)

7000 ADENOMATOID TUMORS IN THE MYOMETRIUM. (Ger.) Bonk, U. (Institut fuer Pathologie des Zentralkrankenhauses Nord, D-282 Bremen 70, Hammersbecker Str. 228, West Germany); Occhionero, F. *Z Krebsforsch* 85(1): 13-20; 1976.

Nine adenomatoid myometrial tumors were found in a survey of 6,000 hysterectomies. The patient ages ranged between 39 and 53 yr. Macroscopically, the tumors appeared as a round-ovoid mass of hazel nut or cherry size. Localization was on the posterior surface of the uterus at the fundus level; two cases were intramural, two subserous, and four a mixture. One was solid, two were macrotubular, and three each were angiomatoid and mixed macrotubular-angiomatoid. Histologically, two typical components were identified. The epitheloid-mesotheloid cells formed solid strings or clusters. The eosinophilic cytoplasm contained vacuoles that impinged on the nuclear membrane. Mitoses were rare. Secondly, the vacuoles interconnected, forming large cavities and canals of various caliber. The tumor stroma consisted of fibromuscular networks with transient lymphocyte clusters. The myometrial localization is probably more frequent than the literature would suggest, since it is apparently confused macroscopically with uterine leiomyoma. The controversial pathogenesis is discussed. (39 references)

7001 SQUAMOUS DIFFERENTIATION AND BASAL LAMINA DEPOSITION IN ENDOMETRIAL ADENOACANTHOMA. (Eng.) Gould, V. E. (Dept. Pathology, Rush-Presbyterian-St. Luke's Medical Center, 1753 West Congress Parkway, Chicago, IL 60612); Sommers, S. C.; Terzakis, J. A. *Am J Pathol* 84(1): 25-38; 1976.

Eleven endometrial adenoacanthomas were studied ultrastructurally, with special attention to the patterns of squamous metaplasia and appearance of the basal laminae. Tonofibrils, irregular keratohyaline, abundant desmosomes, and foci of frank keratinization were observed. However, the granule population was small, with relatively scanty keratohyaline and no definite membrane-coating granules. These features resembled squamous metaplasia; experimental models utilizing estrogens also resulted in similar changes. This appears pertinent in view of the possible etiologic role played by high estrogen levels in human endometrial carcinoma. Most tumor cell clusters were surrounded by a well-defined basal lamina; focal basal lamina reduplication also occurred. These observations suggest a high level of differentiation with respect to synthetic capabilities and cell surface recognition. They correlate well with the relatively favorable prognosis generally observed in endometrial adenoacanthomas, although the absence or defectiveness of basal lamina, indicative of partial dedifferentiation of some neoplastic cells, is occasionally found. (46 references)

7002 PROBABILITY OF MALIGNANT TRANSFORMATION OF OVARIAN TUMORS. (Ger.) Pfleiderer, A. (Univ.-Frauenklinik, 78 Freiburg/Br., Hugstetter Strasse 55, West Germany); Wipprecht, K. G.; Ritzmann, H.; Tan, T. H. *Fortschr Med* 94(2): 81-88; 1976.

Different variables are correlated with type of histologically confirmed gynecological tumor in 601 laparotomies during a 6-yr interval. Tumors of the ovarian mesothelium, which occur mainly in the age group 50-60 yr, constituted 68% of all laparotomies. Of these, 50% were serous, 20% mucoid, and 15% endometrial; 39/205 serous type, 24/80 mucinous type and 19/60 endometrial type tumors were carcinomatous. Tumors of the ovarian stroma, the highest incidence of which is in older women, constituted over 13% of the laparotomies; 14% of these were malignant. Germinal cell tumors, occurring chiefly in the under-50 age group, constituted 14% of the laparotomies but only 3.5% of the malignancies. Simple and dermoid cysts, but few papillary tumors or malignancies, characterized the under-30 population. Between ages 30 and 50, cystic tumors of the ovarian mesothelium were predominant. In the over-50 age group carcinoma had the highest frequency, but papillary and granulosa cell masses also increased. Mucinous carcinoma reached its highest incidence 10 yr prior to that of the serous type, both of which antedated the solid or endometrial types. Approximately half of all mucinous ovarian tumors become malignant (mostly unilateral) by ages 40 to 60; approximately a third of the serous type tumors are malignant or incipiently malignant by ages 50-70. Of the ovarian stromal growths, the 3-yr survival rate for ''benign'' granulosa-cell tumors varies little from that of frank ovarian carcinoma at equivalent stages; granulosa tumors are interpreted as signals of subsequent metastasis. Of the predominantly dermoid-type germinal cell growths, dysgerminoma and teratoma are construed as instances of dermoid growth with carcinoma rather than malignant forms of dermoid degeneration. In general, the frequency of ovarian malignancy up to age 30 is 2%; between 30 and 40, 7%; between 50 and 60, 30%; and between 60 and 70, 37%. Malignancy is also found in 29% of the bilateral neoplasms, but in only 13% of the unilateral types. One-third of all adherent tumors are malignant, compared to only 6%-7% of freely tractable masses. A higher probability of malignancy is also to be expected in the ovarian tissue remaining after hysterectomy, annexectomy, or contralateral ovariectomy. (10 references)

7003 URINARY CHOLESTEROL. VIII. ITS EXCRETION IN WOMEN WITH OVARIAN NEOPLASMS. (Eng.)

Acevedo, H. F. (Wm. H. Singer Memorial Res. Inst., Allegheny General Hosp., Pittsburgh, PA); Campbell, E. A.; Frich, J. C., Jr.; Hayeslip, D. W.; Gilmore, J. *Cancer* 37(6): 2847-2857; 1976.

The urinary excretion of nonesterified cholesterol (NEC) was investigated in 57 women with ovarian neoplasms and/or related nonneoplastic diseases. NEC was analyzed by gas-liquid chromatography. Twelve patients had benign tumors or lesions and 45 had malignant neoplasms of their ovaries. The group of 12 had normal NEC excretion irrespective of the type of tumor or lesion or its degree of extension. In contrast, urinary NEC hyperexcretion occurred in 18 of 19 cystadenocarcinomas of the serous and/or mucinous types, in the endometrioid carcinoma, in the four malignant granulosa cell tumors, in the two mixed malignant germ cell tumors, and in the one malignant mixed mullerian tumor studied. Single cases of clear cell carcinoma and of rhabdomyosarcoma had normal NEC excretion. Urinary hyperexcretion of NEC was also found after surgery in two of seven surviving patients with, according to their staging, localized resectable disease. It is possible that in these two patients NEC hyperexcretion was due to undetected foci of cancer (wrong staging). A normal excretion of urinary NEC was characteristic of 19 of 21 surviving patients treated by surgery and adjunctive therapy in whom follow-up NEC determinations had been performed. They were 16 of 18 cystadenocarcinomas, and single cases of endometrioid carcinoma, malignant granulosa cell tumor, and malignant germ cell tumor. The 94% correlation between the presence of proven active ovarian carcinomas and urinary NEC hyperexcretion is significant, particularly in view of the fact that cystadenocarcinomas constitute more than 75% of all primary malignant tumors. The results indicate that NEC analysis may be used as an objective method to monitor disease and response to surgery and radiation treatment. They also support the concept that NEC hyperexcretion may be a reflection of heightened cholesterogenesis, representing active growth and multiplication of malignant cells. (35 references)

7004 MULTICENTRIC CARCINOMA AND ATYPICAL HYPERPLASIA OF THE MAMMARY GLAND. (Ger.)

Jagla, K. (Pathologisches Institut, Medizinische Hochschule Hannover, Hanover, West Germany); Georgii, A. *Oesterr Z Onkol* 2(5): 145-147; 1975.

Multiple primary carcinoma was found in 9 of 145 mastectomies. Five were scirrhous, with ductal (four) and cribriform (one) second tumors; two showed adenoid or gelatinous differentiation, with second or third tumors of the same type; and the remaining two were lobular carcinomas, with more than two additional masses in the gland. Excluding the lobular carcinomas, six had three, and one had two, primary centers. Atypical hyperplasia occurred in another 58 of the 145 preparations, especially in the ductal epithelium. The frequency of hyperplasia in cases of residual primary tumor after local excision was over 50%, in contrast to 32% in tumor-free cases. (15 references)

7005 HISTOPATHOLOGY OF THE BREAST OF THE AGING FEMALE WITH PARTICULAR REFERENCE TO CANCER.

(Ger.) Kuchemann, K. (Staedtischen Krankenhauses, Leverkusen, West Germany). *Verh Dtsch Ges Pathol* (59): 424-429; 1975.

An autopsy study was made of 60 clinically unremarkable breast and other reproductive tissue from 30 women 61-80 yr old (average 75 yr) to determine precancerous manifestations. (The women had died from various causes other than breast cancer.) The ovaries, pituitaries, and adrenals were also unremarkable. Histologically, only one case (age 82) presented with a florid sclerosing adenosis with multiple microcalcifications. Another (age 83) had a moderately extensive, unilateral, atypical intraductal papilloma with centralized necrosis, but no malignant signs. About 40% of the specimens exhibited different degrees of ductal epithelial hyperplasia. Periductal hyperelastosis and fibrous ductal occlusion occurred in about 20% of the samples. Involutional ectasia, with or without periductal mastitis, was also found. Half showed periductal calcification, probably of arteriosclerotic origin. None of these changes could be considered precancerous. (19 references)

7006 ORAL CONTRACEPTIVES AND MALIGNANT HEPATIC TUMOURS (Letter to Editor). (Eng.)

O'Sullivan, J. P. (Depts. Histopathology and Surgery, St. George's Hosp. & Medical School, London SW1, England); Rosswick, R. P. *Lancet* 1(7969): 1124-1125; 1976.%

A very unusual type of carcinoma of the liver is reported in a woman who had taken the pill. She had been on a low-dose estrogen oral contraceptive for 2 yr and presented with epigastric pain with anorexia, malaise, and weight loss. Ultrasound showed the liver to be massively enlarged, with most of its substance replaced by malignant masses. She had multiple nodules throughout the whole liver, but mainly in the right lobe. The histological appearances of the tumor were those of a combined bile duct carcinoma and hepatocellular carcinoma. The accurate reporting of all cases of liver carcinoma in women, especially those not taking the pill, is advocated so that an accurate association between oral contraceptives and carcinoma can be established. It is important to avoid selectively reporting only cases of carcinoma in women on the pill. (9 references)

7007 LIVER NODULES AND ANDROGENS (Letter to Editor).

(Eng.) Lesna, M. (Univ. Depts. Pathology and Haematology, Royal Victoria Infirmary Newcastle upon Tyne NE1 4LP, England); Spencer, I.; Walker, W. *Lancet* 1(7969): 1124; 1976.

The case history of a man with idiopathic aplastic anemia who received androgenic therapy for 68 mo and developed hepatic nodules is presented. The treatment began at age 2, and the patient died at age 17. Necropsy revealed a massive hemoperitoneum and a rupture in the right lobe of the liver. Structures corresponding to liver adenoma were identified at the edge of the rupture, and three benign hepatocytic nodules were found. There are few cases such as this one in the literature. It is possible that many similar asymptomatic lesions remain undiagnosed. This could represent a special risk group of patients who suffer from a drug-induced but often curable condition. A radical surgical approach should be considered in these cases. (16 references)

7008 NONFUNCTIONING ARGYROPHILIC TUMOR (APUDOMA) OF THE HEPATIC DUCT: SIMPLIFIED METHODS OF DETECTING BIOGENIC AMINES IN TISSUE.

(Eng.) Judge, D. M. (Div. Anatomic Pathology, Dept. Pathology, Milton S. Hershey Medical Center, Pennsylvania State Univ., Hershey, PA 17033); Dickman, P. S.; Trapukdi, S. *Am J Clin Pathol* 66(1): 40-45; 1976.

A foregut endocrine neoplasm in an unusual location, the main hepatic bile duct, is reported in a 19-yr-old man, and simplified methods of detecting similar endocrine tumors are described. Formaldehyde fume-induced fluorescence combined with histochemical procedures showing abundant α-glycerol phosphate dehydrogenase and esterases indicated the neural crest origin of these and related neoplasms. Amine precursor uptake and decarboxylation (APUD) is a significant marker of these cells and gives them their name. (14 references)

7009 CRYPTORCHIDISM AND TESTICULAR TUMORS IN ADULTS.

(Ger.) Fischer, D. (Urologische Universitaetsklinik, 065 Mainz, Langenbeckstrasse 1, West Germany); Wulff, H. D. *Z Urol* 68(5): 373-374; 1975.

Eleven testicular carcinomas were found in treated or untreated cases of cryptorchidism in a clinical sample of 116 testicular tumors. There were eight and three patients with cryptorchidism among 97 germ cell and 7 Leydig cell tumors, respectively. The only sarcoma was in a patient with cryptorchidism. The correlation between Leydig cell tumor and cryptorchidism has not been previously described. (10 references)

7010 ULTRASTRUCTURE OF HUMAN SELLA TUMORS: CORRELATION OF CLINICAL FINDINGS AND MORPHOLOGY.

(Eng.) Landolt, A. M. (Neurosurgical Clinic, Kantonsspital, Univ. Zurich, Switzerland). *Acta Neurochir (Wien)* [*Suppl*] 22: 1-167; 1975.

A total of 111 human sella tumors were studied ultrastructurally and relationships between the morphological findings, the results of clinical and endocrinological evaluations, and the subsequent operative findings were determined. In addition, literature concerning the ultrastructure of the normal human and mammalian hypophysis and human hypophysial tumors is reviewed. Modern staining techniques and immunohistologic procedures have led to the establishment of the ''one cell, one hormone'' theory which holds that each pituitary hormone, with the exception of the two gonadotrophic hormones, is produced by a particular cell type characterized by distinct staining properties; the follicle stimulating and leuteinizing hormones are probably produced by the same cell; however, the exact correlation between each hormone and its production has been established only in experimental animals. In addition to the six granulated hypophysial cells involved in hormone production, there are nongranulated follicular cells that do not appear to produce hormone and probably represent the only true chromophobe cells. The secretory process, which is similar in all pituitary parenchymal cells, is discussed. Pituitary adenomas are the most common sellar tumors and can be divided into two groups: those producing clinical signs of endocrinological hyperactivity; and those producing signs of a space occupying lesion associated with varying degrees of hypopituitarism. The clinical signs, ultrastructure, and origin of these tumors, malignant pituitary tumors, craniopharyngiomas, granular cell tumors of the neurohypophysis, and meningiomas are discussed. (612 references)

7011 LIGHT AND ELECTRON MICROSCOPIC STUDIES FOR CLASSIFICATION OF PITUITARY ADENOMAS.

(Ger.) Saeger, W. (Pathologisches Institut, Universitaet Hamburg, D-2000 Hamburg 20, Martinistrasse 52, West Germany). *Z Krebsforsch* 84(2): 105-128; 1975.

An improvement in the traditional classification of pituitary adenomas into eosinophilic, basophilic, and chromophobic was attempted. Four types of adenoma were differentiated in histological or immunohistological studies of 85 surgically ablated human anterior pituitaries. Eosinophilic adenomas (35 cases) are solid epithelial tumors with little stroma and a medullary architecture. The cell membranes and secretory granule walls are scarcely visible. The cytoplasm is relatively extensive, with eosinophilic granules of different density. The nuclei are oval to polygonal, with loose chromatin and frank nucleoli. Mucoid adenomas (five cases) are also solid or medullary type tumors, with prominent capillarization typical of ACTH cell hyperplasia. Chromophobe adenomas (31 cases) present marked necrotic foci and little evidence of secretory granulation in the typically small cytoplasm. In about 30% of the tumors, the rough endoplasmic reticulum and Golgi apparatus are as prominently developed as those in chromophil tumors of high secretory activity. Oncocytic adenomas (14 cases) are composed of epithelial cells with oxyphilic granules and a finely vacuolated cytoplasm. Unlike the chromophobic cells, oncocytic granulations are based on densely deposited mitochondria rather than secretory granules. The oncocytic secretory assembly also resembles that of the eosinophilic type and may represent a degenerative eosinophilic adenoma. (77 references)

7012 MYELOLIPOMA OF THE ADRENAL GLAND IN ADRENOGENITAL SYNDROME. (Ger.) Schindler, H. (Hanusch-Krankenhaus, Heinrich-Collin-Strasse 30, A-1140 Vienna, Austria). *Wien Med Wochenschr* 125(48): 695-697; 1975.

The case history of a rare adrenal myelolipoma is presented. A 53-yr-old woman presented with frank masculine habitus several years after radioiodine resection of the thyroid for overfunction. The history was exceptional: very premature physical and sexual maturity (5-6 yr of age). Clinically, the 17-ketosteroids in 24-hr urine were 4.5 times the normal level, and adrenogenital syndrome was suspected. Pneumoretroperitoneum and angiography located a large left adrenal tumor, subsequently extirpated. Histologically, there were marrow elements embedded in fat. The right adrenal was hyperplastic. A myocardial infarction 2 yr later called attention to dysfunction in fat metabolism: facile elevation of serum cholesterol, vascular atherogenesis, and increased β-lipoprotein. Adrenogenital syndrome and type II lipid dysfunction represent a double enzyme defect whose co-occurrence with myelolipoma expresses a very rare syndrome. (11 references)

7013 GLIOMAS IN THE FAMILY. (Eng.) Meyer, N. I. (Billings, MT); Schwidde, J. T. *Rocky Mt Med J* 73(3): 143-144; 1976.

Two case reports are presented of gliomas occurring in two sisters, aged 10 and 20. The 10-yr-old was first treated with anticonvulsants after she suffered several left-sided seizures; she had a normal brain scan, skull x-rays, funduscopic examination, and right carotid angiogram but an abnormal electroencephalogram and transient left hemiparesis. After 5 mo she was reexamined because of severe headaches; she then showed left central type facial paresis, left hemiparesis, abnormal funduscopic results, and an avascular mass with a shift of the anterior cerebral artery and internal cerebral vein to the left (as revealed by an angiogram). The patient underwent a partial right temporal lobectomy, radiation treatment, and a second procedure because of a false meningocele. She died about a year after first admission to the hospital. Her sister suffered a focal right-sided seizure that then became generalized; she displayed a right central type facial paresis and right hemiparesis and had an abnormal brain scan and left carotid angiogram, but normal skull x-rays. After several more convulsions, an angiogram showed a shift of the anterior cerebral artery and internal cerebral vein to the right. A glioblastoma multiforme was found. She recovered from the surgery but not from the neurologic impairment. It is suggested that because of the sisters' age and similar malignancy, there may be a genetic factor operating in the family (3 references)

7014 HIPPEL-LINDAU SYNDROME. (Eng.) Coulam, C. M. (Dept. Diagnostic Roentgenology, Mayo Clinic and Mayo Foundation, Rochester, MN 55901); Brown, L. R.; Reese, D. F. *Semin Roentgenol* 11(1): 61-66; 1976.

The Hippel-Lindau syndrome is characterized by CNS and ocular hemangioblastomas, cysts within the solid abdominal organs, polycythemia, and certain neoplasms of the kidney, adrenals, and sympathetic chains. The features of CNS and retinal hemangioblastomas and of visceral cysts are reported from the literature. Over the last 10 yr five patients with this disease were seen at the Mayo Clinic. All had retinal and cerebral lesions. Only one patient had abdominal organ involvement--an enlarging pancreatic cyst. Two of the five patients had diabetes mellitus, but not the patient with the pancreatic cyst. In these five cases, there were no clinical or roentgenographic manifestations of the disease other than in the eyes, cerebellum, and pancreas. (17 references)

7015 NEUROBLASTOMAS IN CHILDREN. A HISTOPATHOLOGICAL STUDY OF 46 CASES. (Fre.) Vilde, F. (Groupe de Recherche de Pathologie Pediatrique I.N.S.E.R.M.U 77, Hopital Necker-Enfants Malades, 149, rue de Sevres, 75730 Paris Cedex 15, France); Nezelof, C. *Ann Anat Pathol (Paris)* 20(4): 305-326; 1975.

A study of 46 neuroblastomas in children (27 boys and 19 girls, age 2 mo to 11 yr) is presented. Ten tumors involved either the thorax and abdomen or the abdomen and plevis; the remaining tumors were localized in the retroperitoneum (18), abdomen (9), thorax (6), pelvis (2), or neck (1). The treatment consisted of surgery, pre- and postoperative radiotherapy, and chemotherapy (cyclophosphamide and vincristine, and also prednisone and 6-mercaptopurine in one patient) Histologic findings indicative of neuroblastoma included the presence of Homer-Wright's rosettes and the presence of fascicles of nerve fibers. Differentiated tumors were identified by fibrillar and neuroblastic proliferation of large neuronal cells (15-100 microns) with cytoplasmic extensions containing Nissl bodies. Undifferentiated tumors (6/46) consisted of lymphocytoid cells (8-10 microns) with more distinct and irregular chromatin than the lymphocytes these tumors could be confused with lymphosarcoma, leukosis, or reticulosarcoma. Histological modification probably induced by the treatment consisted of differentiation and necrosis. No correlation was found between histological type and some biochemical parameters, such as urinary excretion of catecholamines, in the 13 patients studied. There was no apparent relationship between tumor evolution and histological differentiation, sex of the patient, or type of treatment. Patient age, localization and extension of the tumor, and the presence and type of metastases were definite prognostic factors. Histochemical studies of eight neuroblastomas showed strongly positive NAD and NADP reactions, alternatively positive and negative acid phosphatase, and moderate levels of monoamine oxidase. Organotypic cultures of 10 neuroblastomas showed cells typical of a ganglioneuroma on the 16th day of survival; histiotypic cultures of 20 tumors showed formation of nerve fibrilles, and fibroblastic invasion on the 8th day of growth. Chromosome analysis in cultures of four non-irradiated diploid tumors showed no abnormal chromosomes, which may be due to a selection of normal cells in a culture that was 1-2 wk old at the time of the first mitosis; a chromosomal rearrangement of the type Bq+ was observed in one tumor. Various hypotheses on the diversified and controversial evolution of neuroblastomas are reviewed. (39 references)

7016 CONSIDERATIONS ON MALIGNANT TRANSFORMATION OF CONGENITAL EXSTROPHIC BLADDER. (Pol.) Musierowicz, A. (Oddzial Urologiczny Szpitala Wojewodzkiego, ul. Sklodowskiej-Curie 26, 15-950 Bialystok, Poland); Nowinski, A. *Wiad Lek* 29(2): 153-155; 1976.

The course and treatment of malignant transformation of congenital exstrophic bladder in three males over age 50 are described. Radical cystectomy was performed in two patients. One, suffering from adenocarcinoma, died 7 yr after surgery. Seventeen yr after cystectomy for solid carcinoma, the second patient underwent amputation of the penis for colloid carcinoma, which probably developed independently of the bladder tumor. He has been treated successfully as an outpatient for 3 yr. Renal insufficiency in another patient with adenocarcinoma necessitated symptomatic treatment. Despite intensive therapy, no improvement of the general condition was obtained.

7017 COMPARATIVE STATISTICAL RESEARCH OF GASTRIC CANCER IN PATIENTS LESS THAN THIRTY YEARS OF AGE AND THIRTY TO THIRTY-NINE YEARS OF AGE. (Jpn.) Kamino, K. (1st Dept. Surgery, Osaka City Univ. Sch. Medicine, Osaka, Japan); Sugano, S.; Miki, A.; Matsuzawa, H.; Ba, S.; Kawamura, T.; Yamamoto, S.; Sowa, M.; Umeyama, K. *J Jpn Soc Cancer Ther* 10(40): 488-501; 1975.

Eighty gastric cancer patients, all less than 40 yr of age, were divided into two groups: group I included patients less than 30 yr old and group II included patients between 30 and 39. There were no significant clinical and histological differences. Characteristically, gastric cancer in young adults is very invasive of the stomach wall, shows macroscopical serosal infiltration or peritoneal dissemination, and has a histological pattern of poorly differentiated adenocarcinoma or diffuse carcinoma. The distribution of intestinal metaplasia of the gastric mucosa as associated with ulcer or carcinoma was examined by measuring the sucrase activity by the Tes-Tape method. Of 25 cases resected for gastric ulcer, sucrase activity was found in 64%; the activity was also present in 96.7% of 60 cases of gastric carcinoma. Almost all of the cases of gastric ulcer that were less than 40 yr old had no sucrase activity in resected gastric specimens. There was scattered sucrase activity in the specimens of gastric carcinoma patients less than 40 yr, but in cases over 40 the specimens had a high incidence of diffuse activity. These results indicate that gastric carcinoma in patients less than 40 yr of age has a uniform clinical and histological pattern. (38 references)

7018 ENDOSCOPIC FOLLOWUP STUDIES OF EROSIONS OF THE GASTRIC MUCOSA. (Ger.) Krentz, K. (Luisenhospital, 51 Aachen, Boxgraben 99, West Germany); Gohrband, G. *Med Klin* 71(4): 156-162; 1976.

A statistical study of gastric and duodenal mucosal erosion in 65 patients is presented. Endoscopic morphology, including small hemorrhagic, incomplete, and complete erosions; the differentiation of acute and chronic forms and the course of their development; long-term gastroscopic observations; secretory patterns; histology; and protein excretion are also topically analyzed. It is argued that hemorrhagic, incomplete, and complete erosions are sequential transitional stages of the same pathological process, whose terminal phase is expressed by mucosal fold hyperplasia with potential gastric protein loss, although protein synthesis is sufficiently compensatory. No evidence was found to confirm the transformation of complete erosions into authentic polyps. (9 references)

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The particulate material present in several stomach tumors removed from Japanese males (47 to 69 yr old) was investigated with the electron microscope microanalyzer. Sections (10 µm thick) were cut from paraffin-embedded tumor tissue, mounted on slides, the wax was removed, and the section dehydrated in alcohol. The dehydrated sections were then embedded in cellulose acetate and the extraction-replication technique was employed. Areas of the replica selected for study were mounted on numbered grids for transmission electron microscope examination. The location of the particulate matter was plotted on a reference sheet and transferred to the electron microscope microanalyzer. The microanalyzer had two detector systems which were used in parallel: one to give a rapid qualitative and semiquantitative analysis of the specimen and the other a more sensitive and accurate quantitative method. This analysis indicated the presence of a variety of particulate materials in the stomach tumors, including kaolin, talc, aluminum, calcium silicates, and amphibole and chrysotile asbestos fibers. Talc, kaolin, calcium silicate, and other silicates were identified in all seven tumor samples studied. Aluminum silicate was observed in five of the tumors, and asbestos particles in three. It is suggested that the silicates, which were consistently found in all tumors, may have originated from diatomaceous material that was introduced into the alimentary canal from the fish in the Japanese diet. It is also suggested that the diatomaceous materials may be introduced into the stomach by various pharmaceuticals taken by patients with stomach disorders. This factor may also account for the large number of kaolin particles that were observed. (11 references)

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7092 STUDY OF THE SURFACE OF EXPERIMENTALLY INDUCED TUMORS IN THE SMALL INTESTINE OF RATS (SCANNING ELECTRON MICROSCOPIC AND ENZYME HIST CHEMICAL STUDY) (Meeting Abstract). (Ger.) Wagner, R. (Mainz, West Germany); Hoehn, P. *Zentralbl Allg Pathol* 120(2): 134; 1976. (No references)

7093 HISTOCHEMICAL PATTERNS IN EARLY LESIONS AND INFILTRATING ADENOCARCINOMAS INDUCED IN MOUSE DUODENUM BY N-ETHYL-N'-NITRO-N-NITROSOGUANIDINE. (Eng.) Matsuyama, M. (Aichi Cancer Center Res. Inst., Kanakoden, Chikusa-ku, Nagoya 464, Japan); Ito, M.; Yamada, S.; Nakamura, T.; Nagayo, T. *J Natl Cancer Res* 56(4): 791-795; 1976.

7094 INTRASPLENIC TUMOR FORMATION IN THE SYRIA HAMSTER (*MESOCRICETUS AURATUS*) AFTER TRAC EAL IMPLANTS AND TREATMENT WITH DIETHYLNITROSAMINE. (Eng.) Mohr, U. (Medizinische Hochschule Hannover, Karl-Wiechert-Allee 9, 3000 Hannover-Kleefeld, West Germany); Reznik, G.; Emminger, E. *J Natl Cancer Inst* 56(4): 811-818; 1976.

7095 THE EFFECT OF AGE ON MITOCHONDRIAL ULTRASTRUCTURE AND ENZYMES. (Eng.) Wilson, P. D. (Imperial Cancer Res. Fund, 44, Lincoln's Inn Fields, London WC2A 3PX, England); Franks, L. M. *A Exp Med Biol* 53: 171-182; 1975.

7096 STUDIES OF THE ETIOLOGY AND EPIZOOTIOLOGY OF LYMPHOSARCOMA IN *ESOX (ESOX LUCIUS L.* AND *ESOXMASQUINONGY).* (Eng.) Sonstegard, R. A. (Dept. Microbiology, Univ. Guelph, Guelph, Ontario, Canada). *Prog Exp Tumor Res* 20: 141-155; 1976.

7097 SYMPTOMS AND CAUSATION OF THE PLANARIAN DISEASE RELATED TO CANCER. (Eng.) Chandebois, R. (Laboratoire Morphogenetique Animale, Uni site de Provence, Centre Saint-Charles, F-13331 Marseille Cedex 3, France). *Oncology* 32(2): 86-100 1975.

See also:

* (Rev): 6602, 6608, 6609, 6611, 6612, 6614
6616, 6623, 6624, 6625, 6626, 6628
6629, 6638, 6639, 6650, 6654, 6657
6658, 6661, 6663
* (Chem): 6671, 6684, 6707, 6709, 6727, 673
6738, 6739, 6770, 6775, 6780, 678
6790
* (Phys): 6797, 6802, 6804, 6805, 6826
* (Viral): 6881, 6885, 6895, 6903, 6908
* (Immun): 6935
* (Epid-Biom): 7107, 7108, 7109, 7131, 7136,
7142, 7148

3 PRELEUKEMIC STATES IN THE LIGHT OF THE LEUKEMIA CYTOKINETICS. (Eng.) Baserga, A.
inica Medica Univ., Via Giovecca, 203 I-44100
ara, Italy). *Blood Cells* 2(1-2): 285-289; 1976.

ed on the assumption that WBC proliferate in a ılar pattern, an attempt was made to define pre- emia in terms of possible doubling times of emic cells. True preleukemias are considered the sia or other hemopathies from which a true leu- a will originate. Assuming that at diagnosis of nic granulocytic leukemia about 10^4 leukemic s/mm^3 are present in the blood and there is a irculating pool three times greater, the total er of leukemic cells must be about 10^{11} (or t 2^{37}). About 37 doublings then, are required appearance of the first clonogenic cell to t leukemia. In chronic granulocytic leukemia in h cells have a doubling time of 39-75 days, the nt period should be about 4-9 yr. For acute emias, about 35 doubling times are necessary. In racute leukemia with an untreated lethal time of ays, the latent time should not be less than 70 ; in a less acute form with an untreated lethal of 4 mo, the latent time should be 1 1/2 yr. A ussion follows in which the aforementioned role oubling times in defining preleukemia is criti- d. It is very rare to find a steady, regular ression of cells such as that found in doubling s because the ability of cells to proliferate nds on the organism and its environment. The l load of leukemic cells in chronic myeloid emia may vary, and there does not seem to be nite proof that acute myeloid leukemia arises in cell. In chronic granulocytic, chronic lymphocytic, acute lymphocytic leukemias, there may be fluctu- g leukemic mass. Some interesting perspectives arise in cases in which WBC proliferation is not lar and theoretical values are different from e observed. (6 references)

TUMOR FREQUENCY IN AUTOPSY CASES. V. THE LEUKOSES. (Ger.) Ruediger, K. D. (Institut
Allgemeine Pathologie und Pathologische Anatomie,
zinische Akademie Erfurt, 50 Erfurt, Nordhaeuser
sse 74, East Germany); Guethert, H.; Woeckel, W.;
er, S. *Zentralbl Allg Pathol* 120(3): 179-185;
.

-yr survey of necropsy material from a pathology rtment of a middle-sized city was analyzed istically to determine leukemia frequencies in the tumor population older than 15 yr of age. emia is defined as either chronic myelogenous) with mature myeloid cells; chronic lymphocytic), with mature agranulocytes; or immature cell emia (ICL). There were 22,155 autopsy records, uding 7,422 malignant neoplasms, of which 322 leukemias. The sex ratio was 175 men (M) to 147 n (F). There were 72 CML, 100 CLL, and 150 ICL. was found in 33 M and 39 F, CLL in 66 M and 34 nd ICL in 76 M and 74 F. The peak age in CML was t 30 yr for both sexes, with a sharp rise and on either side, especially in men. Male CLL slowly to age 40, then more rapidly to a peak at age 60 before falling sharply; female CLL rose very gradually to a peak at age 70. Male ICL was highest during the teenage years, falling rapidly to a plateau at age 50; female ICL rose sharply, peaking at 30, then falling nonlinearly to a trough at age 70. These figures represent age distributions relative to the necropsy population of each age group. Correlating the leukemic types to the age distribution of total malignant neoplasms finds an av of 10% ICL and 3%-4% CML at 15-39 yr. In the higher ages CLL and ICL are more frequent than CML. (21 references)

7100 TUMOR FREQUENCY IN AUTOPSY CASES. VI. HODGKIN'S DISEASE. (Ger.) Ruediger, K. D.
(Institut fuer Allgemeine Pathologie und Pathologische
Anatomie, Medizinische Akademie Erfurt, 50 Erfurt,
Nordhaeuser Strasse 74, East Germany); Guethert, H.;
Woeckel, W.; Pissarek, D. *Zentralbl Allg Pathol* 120
(3): 186-192; 1976.

A 15-yr survey of necropsy material from a pathology department of a middle-sized city was analyzed statistically to determine the incidence of Hodgkin's Disease (HD) in the tumor population older than 15 yr of age. There were 128 HD cases among 3,987 men (M) and 3,455 women (F) with malignancies in a total autopsy population of 22,155. The sex ratio was 80 M to 48 F. The M frequency max was 4.7% at age 20-24 yr; the F max was 3.3% at age 25-29 yr. Both frequencies subsequently decreased sharply before plateauing after 40-45 yr. These figures are relative to the total number of malignancies per age group. However, if the HD number per age group is expressed as a percent of all HD without regard to age, the incidence curve is biphasic in M, with maxima at 20-24 yr and 55-59 yr, and triphasic for F, with maxima at 25-29 yr, 50-54 yr, and 65-69 yr. Compilation of lymph node group and organ involvement found the paraortal abdominal, mediastinal and cervical nodes and the spleen, liver, bone marrow, and lung both in decreasing order, most involved. (28 references)

7101 MORBIDITY AND MORTALITY AMONG RECIPIENTS OF BLOOD FROM PRELEUKEMIC AND PRELYMPHOMATOUS DONORS. (Eng.) Greenwald, P. (Cancer Control Bureau,
New York State Dept. Health, Albany, NY 12237);
Woodard, E.; Nasca, P. C.; Hempelmann, L.; Dayton,
P.; Maksymowicz, G.; Blando, P.; Hanrahan, L. R.;
Burnett, W. S. *Cancer* 38(1): 324-328; 1976.

The hypothesis that a factor involved in the etiology of human lymphatic and hematopoietic neoplasms may be transmitted by blood transfusion prior to the clinical onset of illness in the donor was tested. One hundred and five New York State residents, who received blood from donors who subsequently developed neoplasms of the lymphatic or hematopoietic tissues, were followed for an average period of 7.05 yr. No recipient developed a leukemia or lymphoma following receipt of blood from a preleukemic or prelymphomatous donor. The results are preliminary because the small size of the recipient group might mask even a large increase in risk among the recipients. (11 references)

7102 SICKLE CELL TRAIT, HEMOGLOBIN C TRAIT, AND BURKITT'S LYMPHOMA. (Eng.) Nkrumah, F. K. (Dept. Child Health, Univ. Ghana Medical Sch., Accra, Ghana); Perkins, I. V. *Am J Trop Med Hyg* 25(4): 633-636; 1976.

In a controlled study in Ghana, the hemoglobin electrophoretic pattern in 112 patients with Burkitt's lymphoma was compared to that of 112 nearest-neighbor controls of the same age, sex, and tribe, as well as 110 sibling controls. The data did not show any statistically significant protective advantage for the sickel cell trait against Burkitt's lymphoma. The hemoglobin C trait appeared to offer a slight protective advantage, but this did not reach statistical significance. These results do not disprove the malaria cofactor hypothesis in the etiology of Burkitt's lymphoma, but they deprive it of additional indirect evidence in its favor. (24 references)

7103 DOUBLE PRIMARIES. (Eng.) Salaman, P. F. (South Wales Radiotherapy and Oncology Centre, Velindre Hosp., Whitchurch, Cardiff, Wales). *Proc R Soc Med* 69(9): 16; 1976.

Two series of double primary cancers are compared. One series of 370 cases was obtained from the South Wales Cancer Registry and the second of 250 cases from the personal files of a radiotherapist. In both, breast plus uterus and respiratory tract plus bladder were common combinations. The high incidence of bladder and bronchus tumors suggests that they are induced by the same etiological factor, smoking. It is possible that breast and uterine tumors have a common hormonal etiological factor. Most of the other double primaries are probably no more than coincidental. It is concluded that the tumors that occur most often in combinations as double primaries are those that are most prevalent in the population. (1 reference)

7104 BREAST PATTERNS AS AN INDEX OF RISK FOR DEVELOPING BREAST CANCER. (Eng.) Wolfe, J. N. (Hutzel Hosp., 432 East Hancock Ave., Detroit, MI 48201). *Am J Roentgenol Radium Ther Nucl Med* 126(6): 1130-1139; 1976.

A retrospective study of the radiographic appearance of the breast parenchyma was made of 7,214 patients. Patients were placed into one of four groups of risk for developing carcinoma of the breast on this basis. The lowest risk group had parenchyma primarily of fat (N1). At progressively higher risk were the groups showing prominent ducts in the anterior portion up to one-fourth the breast volume (P1); those in which the duct pattern occupied over one-fourth the volume (P2); and, finally, those with severe involvement plus dysplasia (DY). Follow-up studies revealed a stepwise progression in the incidence o developing carcinoma of the breast at least 6 mo after the radiographic examination. In one of the two substudies, there was a 37 times greater incidence for those at highest risk compared to the lo risk group. The classifications presented may be o value in the everyday practice of mammography as well as in planning screening programs. (4 referen

7105 EPIDEMIOLOGIC AND ETIOLOGIC FACTORS IN CANCER OF THE BREAST. CATAMNESTIC INVEST GATION OF 749 PATIENTS OF THE DEPARTMENT OF RADIOL AT ESSEN. (Ger.) Bamberg, M. (Institut fuer Strahl therapie, Universitaet Koeln, Joseph-Stelzmann-Str 5 Koln 41, West Germany); Sack, H. *Roentgenblaette* 29(2): 55-66; 1976.

Global incidence, risk factors, genetic factors, staging and prognosis, age distribution, delay tim (the interval from first symptom to initial therap and tumor localization in breast cancer are review and compared with local epidemiological surveys. Although childlessness was determined to be a risk factor in a sample of 645 women, the number of off spring was found to vary directly, not inversely, with risk. This result correlates well with the estrogenic hypothesis of gynecological cancer path genesis. The number of abortions also correlates directly with risk. Most (54%) of the patients wer Stage II. The age distribution in 742 patients was biphasic at 45-49 yr and 55-59 yr of age, with ma of 16.7% and 18.3%, respectively. Direct relations between delay time, tumor size, and axillary node involvement were confirmed. The predominance of le side involvement, especially of the superior late quadrant, was confirmed. (22 references)

7106 MORTALITY FROM BREAST CANCER IN DENMARK DURING THE PERIOD 1961-1971. (Dan.) Gru feld, K. (Dansk institut for klinisk epidemiologi, Svanemollevej 25, DK-2100 Copenhagen O, Denmark); Lysgaard-Hansen, B. *Ugeskr Laeger* 137(37): 2117-2 1975.

During the period 1961-1971, a total of 9,826 wom died from cancer of the breast in Denmark. The an mortality per 1,000 women aged 25 yr and over was 0.61, and this rate increased throughout the peri The mortality was 0.79 in Copenhagen and 0.55 in provinces. In both instances, the mortality incre slightly during the period. The mortality was low young women and increased with age. In all age gr the rate was highest for unmarried women. There w systematic differences in the age patterns for ma women, widows, and divorcees. Lorenz curves show correlation between the number of deaths and the size of the patients with nonlymphoma neoplasms a from normal blood bank donors (the population was lit by demographic criteria and ranked according decreasing breast cancer mortality). (6 references)

07 GASTROENTERAL ANASTOMOSIS AND CARCINOMA IN THE RESECTED STOMACH.

(Ger.) Dahm, K. hirurgische Universitaetsklinik, Martinistrasse 52, 2000 Hamburg, West Germany); Eichen, R.; Werner, ; Kozuschek, W. *Chirurg* 47(9): 494-495; 1976.

e surgical records and autopsy protocols of 72 tients with residual gastric resections were examed to determine if the anastomoses in Billroth II e preferentially carcinogenic. Three cases in the mple had Billroth I (BI), 7 had Billroth II, modication 1 (antecolic anastomosis and enteroanastomis (BII, mod 1) and 62 had Billroth II, modificaon 2 (retrocolic anastomosis without enteroanastomis) (BII, mod 2). Of the 72 patients, 62 were de, (av age 63 yr), with a tumor-free interval of yr) and 10 were female (av age 68 yr, with a mor-free interval of 25 yr). Since there is no teroanastomosis in BII, mod 2, the bile and paneatic juice contact the residual stomach. Duodenostric reflux of duodenal secretion can elicit all grees of morphological change, including atrophic stritis, which is known as a potentiator of gastric lignancy. The retrocolic:antecolic anastomosis tio is 9:1 in favor of carcinoma in the sample der review. Since the ratio of retrocolic to antelic repair is 4:1 in this surgical experience, e increase from 4:1 to 9:1 suggests a selective fect. (8 references)

08 INFLAMMATORY DISEASE OF THE BOWEL: THE RISK OF CANCER.

(Eng.) Alexander-Williams, (Central Hosp., Steelhouse Lane, Birmingham, B4 H, England). *Dis Colon Rectum* 19(7): 579-581; 76.

e association among malignancy, chronic ulcerave colitis, and Crohn's disease is considered with phasis on detection of premalignant changes and eventive measures. The procedure of choice in tients at high risk who have quiescent rectal sease is a total colectomy with a cecorectal or eorectal anastomosis. Precancerous changes may be tected in a rectal biopsy, but since the changes n be patchy, it is possible to be misled if the ea biopsied is one in which there is no premalignt change, even from the colon of a patient who ready has carcinoma complicating ulcerative colis. Because patients with Crohn's disease have had structive intestinal symptoms for many years, it not be possible to detect the development of rcinoma symptomatically. In a series of 500 tients with Crohn's disease who were followed for average of 13 yr, 12/19 who developed cancer had lignancies in the alimentary tract. The risk of veloping these malignancies was significantly eater in patients who had Crohn's disease than ld be expected in a population of the same age and followed for the same length of time. These differences are highly significant, not only for the small and large bowel, but also for the esophagus and pancreas. In some patients with Crohn's disease there is a failure of the lymphocyte immune response, suggesting that there may be some basic immunologic deficiency in Crohn's disease that predisposes to malignancy. It appears that the coexistence of cancer and Crohn's disease is too frequent to be a coincidence. It is suggested that regular enterocolonoscopy or prophylactic total excision of the alimentary tract is impractical in this condition and that the monitoring of carcinoembryonic antigen will prove to be a disappointing screening test. (6 references)

7109 ASSOCIATION OF HEPATOCELLULAR CARCINOMA WITH CIRRHOSIS AMONG AUTOPSY CASES IN JAPAN DURING 14 YEARS FROM 1958 TO 1971.

(Eng.) Miyaji, T. (Dept. Pathology, Osaka Univ. Medical Sch., Joan-cho 33, Kita-ku, Osaka 530, Japan). *Gann Monogr Cancer Res* (18): 129-149; 1976.

Two studies on cirrhosis and hepatocellular carcinoma in Japan are reported, one based on autopsy cases registered over a 14-yr period and another on cases collected from 5,355 autopsies carried out at eight medical schools over 2 yr. The incidence of hepatocellular carcinoma among autopsies was high, amounting to 2.34% (3.26% in men and 1.13% in women) of the registered cases and 2.86% in collected cases. The incidence of cirrhosis was 6.65% in men and 3.24% in women among registered autopsy cases. Most cirrhosis patients had multilobular thin septal patterns (B type cirrhosis or the posthepatitic type). When limited to cirrhoses of unknown etiology, the association with hepatocellular carcinoma was 33.24% in men and 17.03% in women, and the association of hepatocellular carcinoma with cirrhosis was 67.82% in men and 48.74% in women among the registered autopsy cases. The collected cases showed a closer association between hepatocellular carcinoma and cirrhosis: hepatocellular carcinoma with cirrhosis amounted to 83.9% in men and 100.0% in women, and cirrhosis with hepatocellular carcinoma to 48.9% in men and 19.4% in women. In comparison with hepatocellular carcinoma, intrahepatic cholangiocarcinoma had little or no relation to cirrhosis among registered autopsies. (67 references)

7110 ORAL CARCINOMA IN PENINSULAR MALAYSIA: RACIAL VARIATIONS IN THE INDIANS, MALAYS, CHINESE, AND CAUCASIANS.

(Eng.) Ramanathan, K. (Inst. for Medical Res., Kuala Lumpur 03-19, Malaysia); Lakshimi, S. *Gann Monogr Cancer Res* (18): 27-36; 1976.

Racial variations in the frequency of oral carcinoma were studied in peninsular Malaysia. Oral cancer was the second commonest histologically confirmed malignant tumor in Malaysians. Of 898 oral squamous cell carcinoma patients, 31.1% were Indian women, 29.1% Indian men, 10.6% Malay men, 11.1% Malay women, 14.1% Chinese men, and 4.0% Chinese women. The peak incidence for Indian men, Indian women, and Malay women was 50-59 yr and for Malay men and Chinese men 60-69 yr. The peak incidence for Chinese women was 50-69 yr. Except in Malaysian Indians, the average age of the women was generally higher than that of the corresponding men. The buccal mucosa was the commonest site for oral carcinoma in the Indians and in the Malay women. However, it was the least common site in the Caucasians and Chinese men. Carcinoma of the lips and the floor of the mouth was very common in the Caucasians but relatively uncommon in Malaysians. In Indian men, Chinese men, and Chinese women, the upper half of the mouth was more commonly involved than the lower half, but in Malay men and women and in Indian women, the upper and lower halves were equally affected. In Indian men and women and Malay men and women, the left side of the mouth was more commonly involved; in Chinese women the left and right sides were about equally involved; and in Chinese men the right side was more commonly involved. Grade III carcinoma was least common in Indians and most frequent in Chinese. (20 references)

7111 HEPATOCELLULAR CARCINOMA IN THE GAMBIA. (Eng.) Ree, G. H. (Dept. Clinical Tropical Medicine, London Sch. Hygiene and Tropical Medicine, London, WCI England). *Trop Geogr Med* 28(1): 28-30; 1976.

The geographical distribution and the minimum annual incidence of hepatocellular carcinoma was studied in the Gambia. The overall male incidence rate was 12.0/100,000, putting the Gambia into the areas with a high incidence of this disease. There was an apparent concentration of patients in the Banjul division and a centrifugal diminution of rates away from Banjul. (4 references)

7112 LUNG CANCER IN THE BERN REGION. EPIDEMIOLOGY AND SMOKING HABITS VERSUS HISTOLOGY. (Ger.) Scherrer, M. (Pheumologishe Abteilung, Medizinische Universitaetsklinik Bern, Inselpital, CH-3010 Bern, Switzerland); Zeller, C.; Christen, H.; Bachofen, H.; Senn, A.; Zimmerman, H. *Schweiz Med Wochenschr* 106(35): 1167-1173; 1976.

Cell type epidemiology and tobacco habituation in a predominantly rural region (with one city) are correlated. The clinical population consisted of 223 bronchial carcinoma patients, including 125 men (M) with squamous-(SQ), 40 M and two women (F) with oat-cell-(OC), 26 M and 1 F with large-cell-(LC), and 26 M and 3 F with adeno-(AC), carcinoma. The average age was 60 yr; the OC cases were were younger than SQ. The entire lung cancer group was divided into nonsmokers (6), pipe smokers (15) cigar smokers (69), and cigarette smokers (133). Daily cigarette consumption (a) in excess of 29 and (b) between 5 and 29 cigarettes was correlated with 66 to 58 SQ, 23; and 17 OC, 10 and 16 LC, 13 and 14 AC, and 14 and 45 asthmatic patients, respectively. Only one or two cases of each tumor type smoked 0-4 cigarettes daily. Demographically, the rural-urban SQ incidenc was approx proportional to the number of inhabitant the incidences of OC, LC, and AC were significantly preferential for the city. In SC 43% of the cigar smokers were rural compared to 48% urban; in OC, 43 of the cigar smokers were rural, 30% urban. LC and AC combined had only three cigar smokers, and all o the tumors were peripheral. Among cigarette smokers SC was peripheral in 28, central in 36; OC peripher in 11, central in 13; LC peripheral in 18, central in 3; AC peripheral in 18, central in 6. Delay time in months between first symptom and surgery was SC 9, OC 4, LC 8, and AC 6-7. Persistent airway injection, especially in cigar smokers, obscured tumor recognition. (31 references)

7113 BRONCHIAL CANCER IN BERLIN, CAPITAL OF TH G.D.R. II. LUNG CANCER DETECTION BETWEEN 1955 AND 1973. (Ger.) Berndt, H. (Zentralinstitut fuer Krebsforschung der AdW d. DDR, DDR-1115 Berli Buch, Lindenberger Weg 80, East Germany); Gemperle A.; Gemperle, I.; Hansche, G.; Hansche, R.; Lehman C.; Witt, K. *Arch Geschwulstforsch* 46(6): 496-505; 1976.

A statistical survey was made of the diagnosis, initial treatment, adjuvant therapy, annual manage ment and mortality of over 8,600 patients with bronchial carcinoma reported between 1955 and 1974 in Berlin. Over this period, the number of women involved increased from 12% to 20%; the male incidence was much higher but the rate changed littl The number of cases younger than 65 yr fell from 53% to 33%, and the number older than 65 yr rose from 47% to 65%, reflecting both a demographic shi and a cohort phenomenon. No improvement could be found in tumor detection, since the initial and final levels for the period were 14.5% and 17% fo stage I, 19% and 15% for stage II, 35% and 39% fo stage III, and 32% and 29% for stage IV. (6 references)

7114 A PROSPECTIVE SURVEY ON CHEST MALIGNANC FOLLOWING MULTIPLE FLUOROSCOPIES DURING ARTIFICIAL PNEUMOTHORAX THERAPY FOR PULMONARY TUB CULOSIS. (Eng.) Kitabatake, T. (Dept. Radiology, Niigata Univ. Sch. Medicine, Niigata, Japan); Kur kawa, S.; Sakai, K. *Tohoku J Exp Med* 118(4): 317- 1976.

Data were obtained from questionnaires answered b 1,193 patients with pulmonary tuberculosis who ha been treated in four sanatoria over a 20-yr perio Of the 1,193, 568 had been treated by artificial pneumothorax (the pneumothorax group), and 552 ha been treated by other measures (controls). There were 65 deaths in the pneumothorax group, and 40 deaths in the control group. There were no deaths from chest malignancies in the pneumothorax group but four deaths from chest malignancies in the co trol group. No evidence of increased frequency of chest malignancies (including leukemia) following

ltiple fluoroscopies during artificial pneumothorax
s detected. (20 references)

15 EXOGENIC CAUSES OF CANCER IN THE NOSE. (Dan.) Andersen, H. C. (Kommunehospitalet,
-8000 Arhus C, Denmark). *Ugeskr Laeger* 137(44):
67-2571; 1975.

survey of 186 cases of nasal cancer over a 10-yr
riod included 17 cases of adenocarcinoma of the
sal cavity. Twelve of these patients had been
avily exposed to wood dust as furniture makers
0), a turner (1), and a coach maker (1). The latency
riod from first dust-exposure to development of
e tumor was 25-50 yr. The results indicate that
rniture makers run a remarkably high risk of devel-
ing adenocarcinoma in the nasal cavity and that
sal tumors of this type in patients exposed to
od dust for several decades must be considered
cupational diseases. (14 references)

16 RESPIRATORY DISEASE MORTALITY AMONG URANIUM MINERS. (Eng.) Archer, V. E. (Natl.
st. for Occupational Safety and Health, Center for
sease Control, Dept. Health, Education and Welfare,
lt Lake City, UT 84108); Gillam, J. D.; Wagoner,
K. *Ann NY Acad Sci* 271: 280-293; 1976.

mortality of a group of white and American
lian uranium miners was analyzed by a life-table
thod. There was a significant excess of respiratory
ncer among both whites and Indians. Nonmalignant
spiratory disease deaths among the whites ap-
oached cancer in importance as a cause of death
obably as a result of diffuse parenchymal
liation damage. Exposure-response curves for non-
okers were linear for both respiratory cancer and
her respiratory disease.' Cigarette smoking ele-
ted and distorted that curve. Light cigarette
okers were most vulnerable to lung parenchymal
nage. The predominant histologic cancer among
okers and nonsmokers was small-cell undifferen-
ated carcinoma. (9 references)

17 METAL-MATERIAL WORKERS AND LUNG CANCER IN JAPAN. (Eng.) Hirayama, T. (Epidemiology
., Natl. Cancer Center Res. Inst., Tokyo 104,
pan). *Ann NY Acad Sci* 271: 269-272; 1976.

distribution by occupation of 39,255 lung cancer
aths over an 8-yr period was analyzed. An age-stan-
rdized comparison of actual deaths and expected
aths revealed that cancer of the lung had a ten-
cy to occur with a significantly higher frequency
metal-material workers (observed, 232; expected,
.5), and workers in mining and quarrying occupa-
ns (observed, 151; expected, 127.9). By similar
lysis, farmers, and in vitro ^{125}I-labeled nuclear
in saturation, kinetic, and and metal-material
kers were noted as high-risk occupations for stomach cancer, and clerical workers and farmers were noted as such for leukemia. The value of occupational cancer monitoring by such a simple analysis is stressed. (6 references)

7118 CANCER MORTALITY PATTERNS IN THE LEAD INDUSTRY. (Eng.) Cooper, W. C. (Tabershaw/Cooper Associates, Inc., Berkeley, CA 94704). *Ann NY Acad Sci* 271: 250-259; 1976.

The mortality of 7,032 men employed for at least 1 yr in lead production facilities ('smelters') or battery plants was studied over a 23-yr period (1947-1970). There were 1,267 certified deaths. Lead absorption in many members of the cohort exceeded accepted standards by a large amount. The standardized mortality ratio (SMR) for all causes was 107 for smelter workers and 99 for battery plant workers. Deaths from malignant neoplasms were somewhat elevated in both groups, the SMR being 133 for smelter workers and 111 for battery plants. The excesses arose largely from tumors of the digestive organs and the respiratory system. Only three deaths were attributed to malignant renal tumors and seven to tumors of the CNS. The latter findings were of interest in view of the experimental production of renal tumors in rats and mice by injection or po administration of very large doses of lead salts, and a previous report of gliomas in rats fed lead subacetate. (18 references)

7119 MORTALITY PATTERNS AMONG HARD ROCK GOLD MINERS EXPOSED TO AN ASBESTIFORM MINERAL. (Eng.) Gillam, J. D. (Natl. Inst. for Occupational Safety and Health, Center for Disease Control, Public Health Service, Dept. Health, Education, and Welfare, Salt Lake City, UT 84108); Dement, J. M.; Lemen, R. A.; Wagoner, J. K.; Archer, V. E.; Blejer, J. P. *Ann NY Acad Sci* 271: 336-344; 1976.

A study among a group of miners exposed to amphibole fibers (amosite) in the cummingtonite-grunerite series, to airborne concentrations less than 2.0 fibers/cm^3 and to fibers shorter than 5 μm in length demonstrated significant risks of mortality from both malignant and nonmalignant respiratory disease. Exposures to known carcinogens in the mine, other than asbestos, did not exceed normal ambient residential levels for radon daughters or were adjudged to be negligible for arsenic, chromium, and nickel. The observed excess of malignant respiratory disease could, therefore, be attributed to asbestos, singly or in combination with cigarette smoke; and that of nonmalignant respiratory disease could, therefore, be ascribed to asbestos, with a possible additive role from low exposures to free silica dust. The findings point to the need for reevaluation of the adequacy of the Occupational Safety and Health Administration standard of two fibers longer than 5 μm/cm^3, of the deleterious health effects of asbestos fibers shorter than 5 μm, of the adequacy of the present National Institute of Occupational Safety and Health asbestos sampling and analytic methods, and of the potential adverse health effects among general, nonoccupational populations exposed to industrial waste disposals and industrial process effluents that contain trace concentrations of short-fiber noncommercial asbestos minerals. (18 references)

7120 CANCER MORTALITY AMONG CADMIUM PRODUCTION WORKERS. (Eng.) Lemen, R. A. (Natl. Inst. for Occupational Safety and Health, Center for Disease Control, Public Health Service, Dept. Health, Education, and Welfare, Cincinnati, OH 45202); Lee, J. S.; Wagoner, J. K.; Blejer, H. P. *Ann NY Acad Sci* 271: 273-279; 1976.

A retrospective mortality epidemiologic investigation of 292 workers exposed to cadmium at a primary cadmium smelter is reported. There was a significantly increased mortality due to total malignancies (27 vs 17.51 expected), lung cancer (12 vs 5.11), and prostatic cancer (4 vs 1.15) among cadmium smelter workers. Because 20 workers lost to observation were considered alive, these cause-specific results are conservative. They confirm the findings of previous occupational studies and strongly implicate cadmium exposure as a cause of certain types of malignant disease. This finding, in light of the ubiquitous nature of cadmium in the environment, definitely indicates the need for further research and precautionary efforts to reduce occupational and general environmental exposures to this metal and its compounds. (17 references)

7121 PART III. RECENT APPROACHES TO THE CONTROL OF CARCINOGENIC EXPOSURES. CASE STUDY 1: ASBESTOS--THE TLV APPROACH. (Eng.) Nicholson, W. J. (Environmental Sciences Lab., Dept. Community Medicine, Mount Sinai Sch. Medicine, City Univ. New York, New York, NY 10029). *Ann NY Acad Sci* 271: 152-169; 1976.

The Threshold Limit Values (TLV) approach to study of the control of carcinogenic exposure to asbestos is reviewed. With asbestos, as with any carcinogen, no threshold is known below which there are no effects on health. At best, there is only limited dose-response information at levels above those of practical concern. Current exposures to asbestos can only be described crudely at any level, and health effects are only known for past high, but ill-defined, exposures. Limited information exists on the effects of synergistic interactions with other materials. The current US TLV has been evaluated with regard to possible effectiveness in the prevention of asbestos cancer. Yet cancer is the heart of the asbestos-hazard problem. Enforcement of the existing TLV (especially for asbestos) is limited, frequently absent, and often ineffective. However, a TLV can be useful for stimulating the development and application of engineering-control procedures. As technology is developed that makes lower exposure levels possible, TLV's should be reduced to take advantage of that technology. (37 references)

7122 CANCER EXPERIENCE AMONG COKE BY-PRODUCT WORKERS. (Eng.) Redmond, C. K. (Biostatistics, Graduate Sch. Public Health, Univ. Pittsburgh, Pittsburgh, PA 15261); Strobino, B. R.; Cypess, R. H. *Ann NY Acad Sci* 271: 102-115; 1976.

The site-specific cancer mortality, 1953-1966, for men employed in byproduct coke plants in Allegheny County, PA, was studied. Approximate relative risks which take into account race, age, and calendar years of followup, were calculated for various work areas of the coke plant. Men with 5 yr or more at the coke ovens had an excess risk of dying from lun cancer and kidney cancer. Cancers of the digestive system were significantly elevated in nonoven workers. Cancers of the colon and pancreas account for the total excess in cancers of the digestive system Cancers of the buccal cavity and pharynx appeared high in nonoven workers, although the number of deaths involved was small. The results indicate the need to consider nonoven as well as oven workers when evaluating cancer hazards in the coke plant. (24 references)

7123 CANCER MORTALITY AMONG RUBBER WORKERS; AN EPIDEMIOLOGIC STUDY. (Eng.) McMichael, A. J. (Dept. Epidemiology, Sch. Public Health, Univ. North Carolina, Chapel Hill, NC 27514); Andjelkovic D. A.; Tyroler, H. A. *Ann NY Acad Sci* 271: 125-137; 1976.

Four cohorts of active and retired workers, at fou major rubber-tire plants, were identified historica and followed for a 10-yr period (1964-1973). The cancer mortality of these four populations was compared, separately and combined, with that of the general community. For all cancers combined, there was a slight excess above the expected number of deaths, whereas for some specific cancers (stomach colon, prostate, and neoplasms of the lymphatic an hematopoietic systems) there was a marked excess o deaths. Proportional mortality analysis of other small plants revealed similar excesses for these cancers, and some excess for lung, bladder, and CN cancers. Analysis of detailed individual work histories revealed an association of certain cancers with specific job exposures; in particular, lympha leukemia and solvent exposure, and lung cancer and curing-room exposure. For both bladder cancer and stomach cancer, preliminary analyses indicated an association with groups of jobs in adjacent produc tion stages (handling and mixing raw ingredients a processing the 'green' precured rubber, respective (23 references)

7124 INCIDENCE AND EPIDEMIOLOGY OF MELANOMA I TEXAS. (Eng.) Macdonald, E. J. *In: Neo-*

lasms of the Skin and Malignant Melanoma. A Collec-
ion of Papers Presented at the Twentieth Annual
linical Conference on Cancer, 1975, at The Univer-
ity of Texas System Cancer Center; M. D. Anderson
ospital and Tumor Institute, Houston, Texas. (Chi-
ago: Year Book Medical Publishers, Inc.): pp. 279-
2; 1976.

25 AN ALTERNATE METHOD FOR CALCULATING AN ODDS RATIO. (Eng.) Bertell, R. (Roswell
rk Memorial Inst., Buffalo, NY). *J Med* 6(1): 15-
; 1975.

26 SOME PARAMETERS OF KINETICS OF CELLULAR PROLIFERATION IN HUMAN MACROGLIAL TUMOURS.
us.) Kotelnikov, V. M. (N. N. Burdenko Inst. of
urosurgery, USSR Acad. of Medical Sciences, Mos-
w, USSR); Arkhangelsky, V. V.; Safronov, V. A.
r Neirokhir (1): 36-41; 1976.

27 CONSTANCY OF CANCER RISKS IN HUMANS (Letter to Editor). (Ger.) Schmauz, R. (Abteilung
er Pathologie, Medizinische Hochschule, 2400 Luebeck-
Ratzeburger Allee 160, West Germany); Holm-Hadulla,
Dtsch Med Wochenschr 101(40): 1470-1471; 1976.

28 THE EPIDEMIOLOGY OF CANCER IN AFRICANS IN SOUTHERN AFRICA. (Eng.) Keen, P. (Cancer
s. Units, S. African Inst. for Medical Res., Johan-
sburg, South Africa). *S Afr J Surg* 13(3): 105-114;
75. (19 references)

29 THE JOHANNESBURG BONE TUMOUR REGISTRY--THE FIRST 10 YEARS. (Eng.) Solomon, L. (Dept.
hopaedic Surgery, Univ. Witwatersrand, Johannes-
rg, South Africa). *S Sfr J Surg* 13(3): 129-135;
75. (2 references)

30 INTRACRANIAL TUMORS IN SOUTHEAST ASIA. A REVIEW. (Eng.) Glasauer, F. E. (E. J.
er Memorial Hosp., 462 Grider St., Buffalo, NY
15). *Surg Neurol* 6: 257-260; 1976.

1 COMPARATIVE STUDIES ON DYSPLASIA OF ESOPH- AGEAL EPITHELIUM IN FOUR PREFECTURES OF
AN (MIYAGI, NARA, WAKAYAMA AND AOMORI) WITH REFER-
E TO RISK OF CARCINOMA. (Eng.) Mukada, T. (The
ond Dept. Pathology, Tohoku Univ. Sch. Medicine,
dai, Japan); Sato, E.; Sasano, N. *Tohoku J Exp*
119(1): 51-63; 1976.

7132 CHANGING PATTERN OF RESIDUAL TUMOR IN BURKITT LYMPHOMA: FINDINGS AT AUTOPSY. (Eng.) Templeton, A. C. (Dept. Pathology, St. Vincent Hosp., Worcester, MA 01604). *Arch Pathol Lab Med* 100(9); 503-505; 1976.

7133 EPIDEMIOLOGY OF MALIGNANT MELANOMA OF THE SKIN (Meeting Abstract). (Ger.) Berndt, M. (No affiliation given). *Dermatol Monatsschr* 161(7): 582-583; 1975. (No references)

7134 THREE PRIMARY CANCERS IN DIFFERENT ORGANS. (Eng.) Holmes, F. F. (Cancer Information Service, Univ. Kansas Medical Center, Kansas City, KS 66103); Cole, P. A. *Oncology* 32(2): 53-57; 1975.

7135 PAGET'S DISEASE OF THE VULVA. (Eng.) Gallagher, H. S.; Creasman, W. T.; Mackay, B. *In: Neoplasms of the Skin and Malignant Melanoma. A Collection of Papers Presented at the Twentieth Annual Clinical Conference on Cancer, 1975, at The University of Texas System Cancer Center; M. D. Anderson Hospital and Tumor Institute, Houston, Texas.* (Chicago: Year Book Medical Publishers, Inc.): pp. 231-242; 1976.

7136 ALTERED CARBOHYDRATE METABOLISM IN BREAST CANCER AND BENIGN BREAST AFFECTIONS. (Eng.) Muck, B. R. (Universitaets-Frauenklinik Erlangen-Nurnberg Universitaetsstr. 21/23, D-8520 Erlangen, West Germany); Trotnow, S.; Egger, H.; Hommel, G. *Arch Gynaekol* 221(1): 83-91; 1976.

7137 INTERVAL BREAST CANCERS. (Eng.) Whitney, L. W. (Delaware Cancer Network, 1200 Jefferson St., Wilmington, DE 19801). *Del Med J* 48(1): 5-6; 1976. (9 references)

7138 COLLEGE ATHLETICS, BODY SIZE, AND CANCER MORTALITY. (Eng.) Polednak, A. P. (Center for Human Radiobiology, Radiological and Environmental Res. Div., Argonne Natl. Lab., Argonne, IL 60439). *Cancer* 38(1): 382-387; 1976.

7139 THE EPIDEMIOLOGIC RELATIONSHIP BETWEEN PLEURAL MESOTHELIOMA AND ASBESTOS EXPOSURE. (Eng.) Nurminen, M. (Dept. Epidemiology and Biometry, Inst. Occupational Health, Haartmaninkatu 1, 00290 Helsinki 29, Finland). *Scand J Work Environ Health* 1(2): 128-137; 1975.

7140 DIETARY IODINE AND CANCER RISK (Letter to Editor). (Eng.) Eskin, B. A. (Medical Coll. Pennsylvania and Hosp., Philadelphia, PA 19129). *Lancet* 2(7989): 807; 1976.

7141 THE IMPORTANCE OF BODY WEIGHT AND SIZE IN BREAST CANCER. AN EPIDEMIOLOGIC CONSIDERATION. (Ger.) Schicke, B. (Humboldt-Universitaet zu Berlin, Bereich Medizin, Geschwulstklinik, DDR-104 Berlin, Schumannstr. 20/21, East Germany); Moepert, S.; Baldauf, K.; Naehrig, G.; Horst-Meyer, H. *Radiobiol Radiother (Berl)* 17(2): 243-248; 1976.

7142 AGE DISTRIBUTION OF PATIENTS WITH CARCINOMA OF THE UTERINE CERVIX AND ITS PREINVASIVE STAGES (Meeting Abstract). (Ger.) Genton, C. (Zurich, Switzerland); Borek, E. *Schweiz Med Wochenschr* 106 (16): 559; 1976. (No references)

7143 CARCINOMA OF THE CERVIX IN ORAL CONTRACEPTIVE STEROID AND IUD USERS AND NONUSERS. (Eng.) Sandmire, H. F. (704 S. Webster Ave., Green Bay, WI 54301); Austin, S. D.; Bechtel, R. C. *Am J Obstet Gynecol* 125(3): 339-345; 1976.

7144 HISTOLOGIC TYPES OF BRONCHOGENIC CARCINOMA AMONG MEMBERS OF COPPER-MINING AND SMELTING COMMUNITIES. (Eng.) Newman, J. A. (Dept. Pathology, St. James Community Hosp., Butte, MT 59701); Archer, V. E.; Saccomanno, G.; Kuschner, M.; Auerbach, O.; Grondahl, R. D.; Wilson, J. C. *Ann NY Acad Sci* 271: 260-268; 1976.

7145 THE INCIDENCE OF SPONTANEOUS TUMORS OF THE CENTRAL NERVOUS SYSTEM OF WISTAR RATS. (Eng.) Sumi, N. (Institut fuer Toxikologie der Firma E. Merck, D-6100 Darmstadt, Postfach 4119, Frankfurter Str. 250, West Germany); Stavrou, D.; Frohberg, H.; Jochmann, G. *Arch Toxicol (Berl)* 35(1): 1-13; 1976.

7146 ATLANTIC EELS AND CAULIFLOWER DISEASES (OROCUTANEOUS PAPILLOMATOSIS). (Eng.) Deys, B. F. (Radiobiology Lab., Plesmalaan 121, Univ. Amsterdam, Amsterdam, The Netherlands). *Prog Exp Tumor Res* 20: 94-100; 1976.

7147 LEAD IN GASOLINE AND CANCER MORTALITY. (Ger.) Blumer, W. (Arzt fuer Allgemeine Medizin FMH, CH-8754 Netstal, Switzerland); Reich, T. *Schweiz Med Wochenschr* 106(15): 503-506; 1976.

7148 ASBESTOS FIBER EXPOSURES IN A HARD ROCK GOLD MINE. (Eng.) Dement, J. M. (Natl. Inst. for Occupational Safety and Health, Center for Disease Control, Public Health Service, Dept. Health, Education, and Welfare, Cincinnati, 45202); Zumwalde, R. D.; Wallingford, K. M. *Ann NY Acad Sci* 271: 345-352; 1976.

7149 INVESTIGATING POSSIBLE EFFECTS OF ASBEST IN CITY WATER: SURVEILLANCE OF GASTROINT TINAL CANCER INCIDENCE IN DULUTH, MINNESOTA. (Eng. Levy, B. S. (Minnesota Dept. Health, Minneapolis, 55440); Sigurdson, E.; Mandel, J.; Laudon, E.; Pearson, J. *Am J Epidemiol* 103(4): 362-368; 1976. (15 references)

7150 TRACE ORGANIC CONTAMINANTS IN DRINKING WATER; THEIR CONCENTRATION BY REVERSE OSMOSIS. (Eng.) Deinzer, M. (Environmental Health Sciences Center, Dept. Agricultural Chemistry, Ore State Univ., Corvallis, OR 97331); Melton, R.; Mitchell, D. *Water Res* 9(9): 799-805; 1975.

7151 EPIZOOTIOLOGICAL AND EXPERIMENTAL STUDI OF SKIN TUMOURS IN NORTHERN PIKE (*ESOX LUCIUS* L.) IN THE BALTIC SEA. (Eng.) Ljungberg, O (Natl. Veterinary Inst., Stockholm, Sweden). *Prog Exp Tumor Res* 20: 156-165; 1976.

See also:

* (Rev): 6601, 6604, 6608, 6610, 6612, 662
6654, 6656, 6661, 6662, 6664
* (Chem): 6666, 6668, 6670, 6672, 6700, 67
6712, 6722, 6735, 6751
* (Phys): 6825
* (Viral): 6859
* (Path): 6985, 7000, 7009, 7017, 7032, 70
7042, 7068

7152 CLONAL LINES OF TERATOCARCINOMA CELLS IN VITRO: DIFFERENTIATION AND CYTOGENETIC CHARACTERISTICS. (Eng.) McBurney, M. W. (Dept. Biology, Univ. Ottawa, Ottawa, Canada KIN 6N5). *J Cell Physiol* 89(3): 441-455; 1976.

The establishment of clonal lines of embryonal carcinoma in vitro from three independently derived transplantable teratocarcinomas of C3H mice is described, and the characteristics of these lines are compared to an embryonal carcinoma line derived from a transplantable teratocarcinoma of strain 129. The C3H lines were similar to those of 129 origin except that the C3H lines initially required feeder cells for continuous in vitro growth. All of the clonal lines gave rise to a variety of differentiated tissue types both in tumors formed following the injection of cells into syngeneic animals and in vitro. The single cell that gave rise to each of these clones was, therefore, developmentally pluripotential. Analysis of their G-banded chromosomes indicated that the four lines have near-diploid but not absolutely normal karyotypes; the same chromosomal abnormalities were often present in more than one line. Since all of the clonal lines analyzed were karyotypically aneuploid, it appears that a normal karyotype is not required for differentiation into the various tissue types. Tetraploid embryonal carcinoma cells produced by Colcemid or cytochalasin B treatment were also pluripotential in spite of chromosomal instability. Hybrid cells from diploid or tetraploid embryonal carcinoma cells and mouse 3T3 fibroblasts failed to produce tumors when injected sc into newborn 129 mice. Hybrid cells were cultured under conditions in which the embryonal carcinoma cells differentiated but all hybrids behaved as fibroblasts and no other tissue type was formed, suggesting that pluripotentiality was extinguished in the hybrids. Clonal lines were isolated that are resistant to 8-azaguanine; the line tested was deficient in hypoxanthineguanine phosphoribosyltransferase activity and was pluripotential. Failure to recover lines resistant to ouabain may reflect the fact that such mutants are rare in this cell type or are lethal to embryonal carcinoma cells. (39 references)

7153 OPTICAL AND SCANNING ELECTRON MICROSCOPY OF HUMAN CARCINOMAS. (Eng.) Ambrose, E. (Inst. Cancer Res., Royal Cancer Hosp., Chester Beatty Res. Inst., Fulham Road, London SW3, 6JB, England); Mistry, D. H.; Stephen, J.; Tchao, R. *J Microsc Biol Cell* 25(2): 173-180; 1976.

A microexplant method of tissue culture that produces discretely separated groups of the various cell types was used to analyze human carcinomas, particularly of the breast. Time lapse filming, autoradiography, and scanning electron microscopy showed that many microexplants are of a uniform cell type. The analysis showed characteristic labeling of the nucleus with ^{3}H-uridine in the nucleolar region of malignant cells. Scanning electron microscopy showed characteristic features of surface topology and intercellular contacts. Epithelium in a range of normal tissues and benign tumors exhibited ridge-type intercellular contacts. Carcinoma microcolonies showed irregular contacts formed by polypodial projections along the cell borders. (5 references)

7154 IN VITRO COLONY GROWTH OF ACUTE MYELOGENOUS LEUKEMIA. (Eng.) Dicke, K. A. (Dept. Developmental Therapeutics, Univ. Texas System Cancer Center, M. D. Anderson Hosp. and Tumor Inst., Houston, TX 77030); Spitzer, G.; Cork, A.; Ahearn, M. J. *Blood Cells* 2(1/2): 125-137; 1976.

A newly developed culture system was used in which the marrow from acute myelogenous leukemia patients (untreated and relapse) forms leukemic cell colonies. In this system, phytohemagglutinin is the essential stimulator for colony formation. The leukemic origin of the colonies was provided by ultrastructural morphology and cytogenetics. Colony formation by leukemic cells in this system was predominantly independent from the WBC factor that is the main stimulator in the Robinson assay for growing colonies of marrow cells from hematologically normal individuals. (23 references)

7155 MODEL FOR INITIAL VASCULAR PATTERN IN MELANOMA TRANSPLANTS. (Eng.) Deakin, A.S. (Dept. Applied Mathematics, Univ. Western Ontario, London, Ontario, Canada). *Growth* 40(2): 191-201; 1976.

A simple mathematical model is proposed that adequately accounts for initial vasculature established in a melanoma transplant. It is assumed that the tumor produces tumor angiogenesis factor (TAF), a substance that elicits capillary sprouts from the vascular bed of the host. These sprouts then invade the tumor along the TAF gradient and cross-connect, forming a vascular pathway similar to the experimental patterns in a hamster cheek pouch. This model is then extended to include the migration of loops. The rupture and formation of sprouts from these loops are assumed to depend on the strength of the stimulus (TAF). Under the assumption that the production of TAF is significantly reduced in a neighborhood of an established vessel, the network formed by the vessels in the tumor corresponds to the observed arboreal patterns. (12 references)

7156 A TISSUE MODEL FOR THE STUDY OF CELL PROLIFERATION PARAMETERS IN VIVO. (Eng.) Enerback, L. (Dept. Pathology 11, Univ. Linkoping, Sweden); Franzen, L.; Norrby, K. *Histochemistry* 47(3): 207-218; 1976.

The following microscopic, cytochemical and biochemical parameters of cellular proliferation have been measured successfully in pieces of rat small-gut mesentery stretched over slides pretreated with an egg white-glycerol mixture (50/50); mitosis in mesothelial and fibroblastic cells in Feulgen-stained specimens; photometric estimation of the DNA contest in Feulgen-stained specimens; and radiochemical estimation of DNA synthesis. Intraperitoneal saline injections into the rats prior to death caused an increase in cell proliferation in the mesentery. (25 references)

7157 REVERSIBILITY OF CHALONE-MEDIATED CELL GROWTH DEPRESSION IN HUMAN CARCINOMAS IN VITRO.

(Eng.) Korsgaard, R. (Research Dept., Univ. Hosp., S-221 85 Lund, Sweden); Iversen, O. H.; Burton, D. R.; Isaksson-Forsen, G. *Med Sci: Cancer* 4(10): 473; 1976.

The reversibility of the cell growth inhibitory effects of epidermal G_2 chalone extracts (from hr/hr mice) on human epidermoid carcinomas in vitro was studied. Three epidermoid carcinomas and three adenocarcinomas used as controls from the respiratory tract were grown on film slides. The reversibility of the chalone-mediated tumor cell growth depression was tested in the exponential growth phase. Epidermal G_2 chalone powders were dissolved in the nutrient medium and added to the cell cultures at 1 μg/ml. The number of cells per 200 mm^2 was counted before and 4 hr after chalone addition. These and subsequent counts, following changes of nutrient media in all cultures, demonstrated the reversibility of epidermal G_2 chalone activity. The adenocarcinoma cell cultures were nonresponsive. In another experiment, colcemid was added to the cultures after 1, 5, and 9 hr and chalone extracts were added after 4 hr. The cell culture media were changed 3 hr after each colcemid addition, and the number of mitoses per 1,000 cells was counted. The results of this experiment also demonstrated the reversibility of chalone activity. These findings add support to the hypothesis that abnormal chalone regulatory mechanisms might be found in malignant human tumors. (6 references)

7158 POTASSIUM TRANSPORT IN NORMAL AND TRANSFORMED MOUSE 3T3 CELLS.

(Eng.) Spaggiare, S. (Inst. General Physiology, Univ. Parma, Parma, Italy); Wallach, M. J.; Tupper, J. T. *J Cell Physiol* 89(3): 403-416; 1976.

The components of unidirectional potassium influx and efflux were investigated in the mouse BALB/c 3T3 cell and the simian virus 40 (SV40)-transformed 3T3 (SV40 3T3) cell in both the exponential and stationary growth phases. Unidirectional K influx and efflux were determined from the kinetics of uptake or washout of ^{42}K or ^{86}Rb. Cells were routinely plated at 3 to 5 x 10^4 cells/cm^2. Transport measurements were made 1-2 days after plating, at which time both cell types exhibited exponential growth. Total unidirectional K influx in the 3T3 line was twice that of the SV40 3T3 (3.5×10^{-4} versus 1.4×10^{-4} mole/hr/ml). Percent of the total influx sensitive to inhibition by ouabain was similar in both cell types (63% in 3T3 and 64% in SV40 3T3.) Preincubation of both types of cell with ouabain for 5 min prior to isotope addition did not alter the results, indicating that the affinity of the inhibitor for the pump site is similar in both conditions, probably the active inward K pump. Both cell lines also had components of unidirectional K influx and efflux that were sensitive to furosemide. Data suggest this component represents a one-for-one K exchange mechanism. The fraction of K influx mediated by the ouabain sensitive component was reduced to half its value when exponential versus density-inhibited 3T3 cells were compared (63% versus 31% of total influx). No comparable drop occurred in the SV40 3T3 cell at equivalent cell densities (64% versus 56% of total influx) These results suggest that the pump-mediated component of K influx is correlated with growth. The furosemide-sensitive component represents 20% of the total unidirectional K influx and efflux in both cell lines in sparse culture. At high cell densities, where growth inhibition occurs in the 3T3 cell but not the SV40 3T3 cell, the furosemide-sensitive component doubled in both cell lines, indicating that the apparent K-K exchange mechanism is density-dependent rather than growth-dependent. No direct evidence exists indicating the specific manner by which transport phenomena are integrated with growth control. This study indicates that such changes occur in cation transport and that the changes fall into at least two categories, those unique to transformation and those unique to the physical state of the culture. (33 references)

7159 STUDIES ON THE ENHANCEMENT BY CYCLOPHOSPHAMIDE (NSC-26271) OF ARTIFICIAL LUNG METASTASIS AFTER LABELED CELL INOCULATION.

(Eng.) de Ruiter, J. (Radiobiological Inst. TNO, 151 Lange Kleiweg, Rijswijk, The Netherlands); Smink, T.; van Putten, L. M. *Cancer Treat Rep* 60(4): 465-470; 1976.

The retention of ^{125}I-5-iodo-2'-deoxyuridine-labeled tumor cells in the lung after iv injection was compared with the formation of tumor colonies in the lung 15 days after injection in C57BL/KA mice. The modification in lung retention after treatment with cyclophosphamide (CP), isophosphamide, *Corynebacterium parvum*, and heparin paralleled the changes in lung-colony numbers by these treatments. Since the modifications could be identified as early as 1 hr after iv administration of tumor cells, the modification of lung metastases by CP and *C. parvum* was not due to immunologic mechanisms. Comparison with the lung retention of heat-killed tumor cells and living embryonic cells showed that CP induced an increased retention of all three cell types. In contrast, *C. parvum* decreased the retention of living tumor cells, but failed to modify the retention of dead tumor or living embryonic cells. Heparin decreased the retention of living and dead tumor cells, but did not affect the retention of living embryonic cells. Since no similar cell types were affected by the various treatments, it is likely that different mechanisms are involved. It is suggested that CP decreases the nonspecific resistance against the lodging and growth of any type of cell in the lung. (19 references)

160 DIFFERENT CALCIUM REQUIREMENTS FOR PROLIFERATION OF CONDITIONALLY AND UNCONDITION- LLY TUMORIGENIC MOUSE CELLS. (Eng.) Boynton, A. L. Animal and Cell Physiology Group, Div. Biological ciences, Natl. Res. Council of Canada, Ottawa, anada K1A 0R6); Whitfield, J. F. *Proc Natl Acad Sci SA* 73(5): 1651-1654; 1976.

he idea that a change in regulatory function of alcium is involved in neoplastic transformation was tudied in transformed derivatives of BALB/3T3 mouse ells. Conditionally tumorigenic BALB/3T3 mouse ells could not sustain DNA synthesis and consequently topped proliferating in media containing low con- entrations (0-0.02 mM) of physiologically available alcium. By contrast, neoplastically transformed ells (tumorigenic in mice without special assis- ance) could sustain DNA synthesis and proliferate n the calcium-deficient media. An ability to with- tand calcium deprivation may prove to be a reliable ndicator of neoplastic transformation. (44 refer- nces)

161 ALTERATION BY MALIGNANT TRANSFORMATION OF THE CALCIUM REQUIREMENTS FOR CELL PROLIF- RATION IN VITRO. (Eng.) Swierenga, S. H. H. (Animal nd Cell Physiology Group, Div. Biological Sciences, RCC, Ottawa, Ontario, Canada); Whitfield, J. F.; llan, D. J. *J Natl Cancer Inst* 57(1): 125-129; 976.

e possibility of alteration in the proliferative ontrol system of calcium in neoplastic transforma- ion is explored. Cells from the thigh muscles of rmal fetal rats proliferated rapidly and indefin- ely in a medium containing adult rat plasma and a rmal free-calcium concentration, but they could t proliferate in calcium-deficient plasma medium. the animals grew older, the cells became increas- gly less able to proliferate even in normal (high- lcium) plasma medium, though they retained the tential to proliferate in a more conventional dium containing fetal bovine serum. By contrast, oplastic adult cells from malignant rhabdomyosar- mas (induced by Ni_3S_2) proliferated rapidly and definitely in both normal and low-calcium plasma dium. (21 references).

62 IDENTIFICATION OF ABNORMAL CELLS IN SHORT TERM MONOLAYER CULTURES OF HUMAN TUMOR ECIMENS. (Eng.) Wright, J. E. (Dept. Radiothera- utics, Univ. Cambridge, Cambridge, England); Dendy, P. *Acta Cytol (Baltimore)* 20(4): 328-334; 1976.

ort-term monolayer cultures were prepared from nan malignant biopsy specimens, to verify that nor cells and not normal cells grow from the stroma. nolayer cultures were obtained from a wide range human tissues, both normal and malignant, and romosome spreads were prepared by a modification standard procedures. The cells were Feulgen- ained, and DNA values were obtained for cells ested in mitosis. Metaphase DNA values for normal cells and for cells from a benign tumor were constant, close to the expected value relative to bull sperm, and showed little spread about the mean. Metaphases from malignant cells had abnormal mean DNA values and generally showed a much greater spread about the mean. The results confirm that for cells grown in vitro from tumor biopsies, those that are in the cell cycle and reach mitosis are abnormal and presumably malignant. (24 references)

7163 CHARACTERISTICS OF CELL MEMBRANES FROM SOMATIC CELL HYBRIDS BETWEEN RAT HEPATOMA AND MOUSE L-CELLS. (Eng.) Marciani, D. J. (Lab. Biochemistry, NCI, Bethesda, MD 20014); Lyons, L. B.; Thompson, E. B. *Cancer Res* 36(8): 2937-2944; 1976.

Cell membranes from mouse L-cells (L-B82), rat hepatoma (HTC-H1), and three clones of their somatic cell hybrids (07, V4a and V5) with different degrees of density-dependent inhibition of growth were analyzed by polyacrylamide gel electrophoresis. The membrane polypeptides of the hybrid clones were all similar. All had higher proportions of polypeptides with molecular wts of 56,000 and 45,000 than their parents or their normal counterparts. The major glycoprotein from cell hybrids appeared to be identical with that of rat liver or rat hepatoma cells and different from that of L-cells. One hybrid showed density-dependent inhibition of growth; the other two, like both parents, did not. All produced tumors in nude mice, although tumor production by the hybrids was delayed. A large external protein (molecular wt 240,000) iodinated by a lactoperoxidase-catalyzed reaction was missing in the parents but was present at high levels in all their hybrid clones. Thus, there was a lack of correlation between this protein, growth control in vitro, and tumorigenicity. There was also no correlation between agglutination of these cells by concanavalin A and tumorigenicity. The factors controlling these membrane properties were therefore independent of density-dependent inhibition of growth and of those factors controlling the expression of cancer. (51 references)

7164 FETAL HEMOGLOBIN LEVELS IN ACQUIRED AND CONGENITAL HEMATOLOGICAL DISEASES AND MALIGNANT TUMORS IN ADULTS. (Ger.) Hohamedi, S. (Pahlawi Medical Faculty, Univ. Teheran, Teheran, Iran); Sinzinger, H.; Scheiner, C.; Pietschmann, H. *Wien Klin Wochenschr* 88(15): 485-488; 1976.

Adult fetal Hb (Hb F) levels were assayed to test their diagnostic sensitivity in various diseases. A total of 525 assays was made on 103 healthy subjects or those without evidence of hematological, renal hepatic, rheumatic, or neoplastic stigma (C) and 233 patients (T). In C the erythrocytes were Hb F negative in 79 cases, 0.1%-0.2% positive in 14 cases, and 0.2%-0.4% positive in 9 cases. Among 122 patients with hematological disease, 64 were negative, including chronic leukemia, malignant lymphoma, plasmocytoma, and polycythemia, and 58 were positive, including acute leukemia, pernicious anemia, hemolytic anemia, and osteomyelofibroses. Although renal and rheumatic diseases were mainly negative, liver diseases and malignant tumors were mostly positive. Of 34 tumor cases, 17 were negative and 17 were positive, 9 of them over 0.4%. (25 references)

7165 GLYCOSAMINOGLYCANS AND PROTEOGLYCANS OF HUMAN CHONDROSARCOMA. (Eng.) Sweet, M. B. (Orthopaedic Res. Lab., Univ. Witwatersrand, Johannesburg, Republic South Africa); Thonar, E. J.; Immelman, A. R. *Biochim Biophys Acta* 437(3): 71-86; 1976.

The glycosaminoglycans and proteoglycans were studied in a chondrosarcoma from a 45-yr-old man. Glycosaminoglycans were fractionated and identified by cetylpyridium chloride cellulose chromatography, ECTEOLA cellulose ion-exchange chromatography, and electrophoresis on cellulose acetate. Proteoglycans were extracted by low ionic strength solutions and by 4 M guanidinium chloride and fractionated by equilibrium density-gradient centrifugation and gel chromatography on Sepharose 2B. The tumor matrix contained most of the glycosaminoglycan and proteoglycan elements found normally. There were both the 4- and 6-sulfate isomers of chondroitin sulfate and a high concentration (12% of hexosamine) of hyaluronic acid. Proteoglycans were poor in carbohydrate moieties, and a proportion was capable of aggregation. Amino acid analysis of the fractionated proteoglycans suggested the presence of a single protein core. A substance with the characteristic amino acid composition of glycoprotein link was recovered from the top of the dissociative density gradient. (33 references)

7166 TRANSLATIONAL CONTROL OF PROTEIN SYNTHESIS IN STIMULATED WI-38 FIBROBLASTS. (Eng.) Whelly, S. M. (Dept. Pathology, Fels Res. Inst., Temple Univ. Sch. Medicine, Philadelphia, PA 19140); Baserga, R. *Biochim Biophys Acta* 425(2): 234-245; 1976.

The possible alteration of the ribosomal translational system of stationary WI-38 human diploid fibroblasts by a nutritional change was investigated by measuring the number of growing peptide chains and the rate at which the ribosomes are able to incorporate ^{14}C-leucine into protein in a standardized cell-free protein synthesis system. When confluent monolayers of WI-38 cells were stimulated to proliferate by serum, a transient increase in the peptide elongation rate by ribosomes was observed at 60 min after stimulation. The rate of ^{14}C-leucine incorporation into protein by WI-38 ribosomes increased 2.32 times, but the number of growing nascent peptides increased only 1.33 times. The addition of sodium fluoride and aurintricarboxylic acid, inhibitors of the in vitro peptide initiation reaction, did not eliminate the increase in protein synthesis. The early stimulation of peptide chain growth was independent of RNA synthesis, as indicated by the fact that actinomycin D in a dose that blocks RNA synthesis by 90% did not eliminate the increase in protein synthesis. The stimulation of WI-38 diploid fibroblasts also resulted in an alteration in the relative amounts of certain ribosome-associated proteins that cannot be accounted for by an increase synthesis of fibroblast ribosome-associated proteins Experiments investigating the effects of preincubation of ribosomes from control and stimulated fibroblasts in conditioned medium suggest that ribosomes are maintained in a relatively inactive state in density-inhibited cultures. The catalytic activity appears to be suppressed by a specific inhibitor. When stationary cultures are stimulated by a nutritional change, the inhibitor may be removed. In WI-38 fibroblasts there appears to be a correlation between increased elongation rate, removal of an inhibitor, and a change in the relative amount of certain ribosome-associated proteins. (44 references

7167 CORRELATION BETWEEN HISTONE PHOSPHORYLATION AND TUMOR AGEING IN EHRLICH ASCITES TUMOR CELLS. (Eng.) Thomas, G. (Institut fuer Mediz ische Strahlenkunde der Universitaet, D-8700 Wurzbu West Germany); Hempel, K. *Exp Cell Res* 100(2): 309-312; 1976.

The microheterogeneity of F 1 histone was studied in Ehrlich ascites tumor male NMRI mice between 3 and 16 days after inoculation. The cell number per mouse increased during the first 8 days (proliferation phase) and thereafter remained constant (nonproliferating phase). The number of F 1 subfraction was reduced from five in proliferating cells to three in nonproliferating ones. In short-term exper ments using ^{32}P phosphate the label was only found in F 1 histone from proliferating cells but not in that from resting cells. However, F 2*a* histone, the other phosphorylated histone in interphase cells, was labeled in young and old cell populations. When ^{32}P-labeled F 1 histone was treated with alkaline phosphatase, not only was the label split off but also the number of subfractions was reduced from five to three. These results lend additional eviden to the hypothesis that at least some of the F 1 subfractions are derived from the same protein by phosphorylation. (22 references)

7168 THE RIBOSOMES OF THE NOVIKOFF TUMOR CELL ISOLATION, GENERAL PROPERTIES AND ELECTR PHORETIC ANALYSIS OF THE PROTEIN MOIETY. (Eng.) Knopf, U. C. (Natl. Res. Council Canada, Saskatoon Sask., Canada). *Oncology* 32(5/6): 302-310; 1975.

The ribosomes from Novikoff tumors and rat liver cells were extracted, purified and analyzed. The isolated ribosomes were active in Poly-U directed Poly-Phe synthesis. Sucrose density gradient centr fugation showed that the Novikoff tumor cells contained, in contrast to liver cells, almost no poly somes. The ribosomal proteins from the ribosomes were extracted and subsequently analyzed by gel electrophoresis. No differences between the ribosomal proteins of the normal and neoplastic cells could be detected by one-dimensional sodium dodecyl sulfate gel electrophoresis. Two-dimensional urea gel electrophoresis showed great similarities between the ribosomal proteins of the two kinds of cells; however, some differences were detected. (24 references)

7169 CHARACTERIZATION OF A MACROMOLECULAR INHIBITOR OF POLYPEPTIDE CHAIN INITIATION FROM HRLICH ASCITES TUMOR CELLS. (Eng.) Clemens, M. J. (Dept. Biochemistry, St. George's Hosp. Medical Sch., Blackshaw Rd., Tooting, London, SW17 0QT, England); Pain, V. M.; Henshaw, E. D.; London, I. M. *iochem Biophys Res Commun* 72(2): 768-775; 1976.

o determine whether Ehrlich cells possess an inhibitor of protein synthesis similar to that in rabbit eticulocytes, a protein fractionation procedure previously used for the partial purification of the rreversible inhibitor in reticulocyte lysates on ncubation in the absence of hemin) was used. The hrlich cell preparation had no effect on the initial ate of amino acid incorporation in a hemin-supplemented abbit reticulocyte lysate system, but caused a ather abrupt decrease in the protein synthesis rate t later times of incubation. If hemin was not added o the incubation mixture, protein synthesis shut ff after a lag of several minutes. The inhibitor ad no appreciable endonuclease activity towards eticulocyte polysomes, but under conditions of rotein synthesis it caused disaggregation of polyomes. The latter effect indicates that polypeptide hain initiation is the major site of action. The ffect of the inhibitor could be overcome by the nitiation factor that forms a ternary complex with et-tRNA and GTP and binds to 40S ribosomal subunits. nese results indicate that Ehrlich ascites tumor ells possess a soluble, nondialyzable inhibitor of rotein synthesis that has properties in common with ne irreversible form of the hemin-controlled transational inhibitor in reticulocytes. (27 references)

170 CHANGES IN TRANSFER RNA'S IN HUMAN MALIGNANT TROPHOBLASTIC CELLS (BEWO LINE). Eng.) Kuchino, Y. (Dept. Microbiology, Univ. Colorado Medical Center, Denver, CO 80220); Borek, E. *ncer Res* 36(8): 2932-2936; 1976.

n aminoacyl transfer RNAs prepared from human lignant trophoblastic cells (BeWo line were comred with the corresponding aminoacyl transfer RNAs om normal human chorionic tissue by cochromatogphy on an RPC-5 column. Phenylalanyl transfer RNA he-tRNA) of BeWo cells had, in addition to the ngle species of Phe-tRNA found in normal chorionic ssues, an early eluting component. When Phe-tRNA om the chorion was exposed to mild acid to exercise e Y base, it eluted in the same position as the rly eluting Phe-tRNA of BeWo cells. Therefore, the Wo Phe-tRNA was partially undermodified. Tyrosyl ansfer RNA of BeWo cells had a broad-based peak that eluted later than the normal one and probably consisted of two or more tyrosyl transfer RNAs. Seryl transfer RNA of BeWo cells showed two peaks of acceptor activity, while seryl transfer RNA of noral chorion had a third peak that eluted at a higher salt concentration. Quantitative alterations were also detected in an early eluting methionyl and lysyl transfer RNA and in a late eluting arginyl transfer RNA from BeWo cells and normal chorion. The remaining four transfer RNAs (leucyl, aspartyl, valyl, and histidyl) from the two sources did not show any significant differences in elution profiles. These alterations appeared to be due to new or altered species of transfer RNA rather than to differences in aminoacyl transfer RNA synthetase. The transfer RNA methyltransferase capacity of the enzymes from BeWo cells was two times higher than that of the enzymes extracted from the chorion. (32 references)

7171 CELL-FREE TRANSLATION OF MESSENGER RNA FOR A MYELOMA LIGHT CHAIN PREPARED FROM SYNCHRONISED PLASMACYTOMA CELLS. (Eng.) Abraham, K. A. (Biokjemisk Institutt, Universitet i Bergen, Arstadveien 19, N-5000 Bergen, Norway); Eikhom, T. S.; Dowben, R. M.; Garatun-Tjeldsto, O. *Eur J Biochem* 65(1): 79-86; 1976.

Crude preparations of biologically active mRNA, which code for a myeloma (MPC-11) light chain, were isolated by two successive sucrose gradient centrifugations of RNA extracted from membrane-bound ribosomes. The mRNA preparation was separated into a poly(A)-rich and a poly(A)-poor fraction by oligo(dT)-cellulose chromatography. Both fractions could direct the synthesis of light chains in reconstituted cell-free systems derived from heterologous cells (ascites tumor lysates) and homologous cells (MPC-11 cells in suspension culture). The identity of the products in vitro was confirmed by comparing their migration with that of light chains produced in vivo upon electrophoresis in sodium dodecylsulfate/polyacrylamide gel and from the profiles of tryptic peptides obtained by chromatography on Aminex A-5 ion-exchange columns. The template activity of the poly(A)-rich light chain mRNA fraction showed very little variation during the cell cycle. The activity of the poly(A)-poor fraction, in contrast was maximal during the early S phase. It is concluded that maximal synthesis of immunoglobulins observed in vivo during the later *G1* phase of the cell cycle is achieved by translational control mechanisms. (35 references)

7172 CHROMATOGRAPHIC AND FUNCTIONAL COMPARISON OF HUMAN PLACENTA AND HELA CELL TRYOSINE TRANSFER RIBONUCLEIC ACIDS. (Eng.) Olsen, C. E. (Dept. Biochemistry, Univ. California, Berkeley, CA 94720); Penhoet, E. E. *Biochemistry* 15(21): 4649-4654; 1976.

The mammalian isoaccepting transfer RNAs (tRNAs) of human placenta and HeLa cells were compared chromatographically on RPC-5 columns and functionally in a rabbit reticulocyte, cell-free, protein-synthesizing system. Four major tyrosine isoacceptors were found in both HeLa cells and human placenta, with the HeLa isoacceptors eluting generally later than the placental isoacceptors. Although there was some overlap, none of the isoacceptors from one source was identical with any of the isoacceptors from the other source. The placental tyrosine isoacceptors were qualitatively the same as those previously studied from human liver. The patterns were reproducible under a number of conditions, including the use of homologous or heterologous synthetases, so that they are a true representation of the tyrosine tRNAs present in both sources. The individual isoacceptors were compared in a rabbit reticulocyte cell-free system for both rate of incorporation of tyrosine, and site of incorporation in the globin chain. There were no significant differences in the incorporation rates among the isoacceptors, nor were there any differences in the incorporation sites. All eight isoacceptors donated tyrosine equally well into the three tyrosine-containing tryptic peptides of α-globin. Whatever the structural differences among the tyrosine isoacceptors are, they do not affect the function of the tRNA in this protein-synthesizing system. It seems unlikely, therefore, that transformation-dependent changes in tRNA are responsible for changes in the regulation of specific protein synthesis at the translational level. Whether tRNAs have other functions that are affected by the structural alterations is not known. (20 references)

7173 THE SYNTHESIS OF POLYADENYLIC ACID-CONTAINING RIBONUCLEIC ACID BY ISOLATED MITOCHONDRIA FROM EHRLICH ASCITES CELLS.

(Eng.) Aujame, L. (Dept. Biochemistry, McMaster Univ., Health Sciences Centre, Hamilton, Ont., Canada L8S 4J9); Freeman, K. B. *Biochem J* 156(3): 499-506; 1976.

The nature and number of messenger RNA (mRNA) species encoded by mitochondrial DNA are not clear. As an approach to resolving conflicting results of earlier studies, the synthesis of poly(A)-containing RNA by isolated mitochondria from Ehrlich ascites cells was studied. Isolated mitochondria incorporate [^{3}H]AMP or [^{3}H]-uridine 5'-triphosphate into an RNA species that adsorbs on oligo(dT)-cellulose columns or Millipore filters. Hydrolysis of the poly(A)-containing RNA with pancreatic and T_1 ribonucleases released a poly(A) sequence with that had an electrophoretic mobility slightly faster than $4S_E$. In comparison, ascites cell cytosolic poly(A)-containing RNA had a poly(A) tail that had an electrophoretic mobility of about $7S_E$. Sensitivity of the incorporation of [^{3}H]-AMP into poly(A)-containing RNA to ethidium bromide and to atractyloside, and lack of sensitivity to immobilized ribonuclease added to the mitochondria after incubation indicated that the incorporation site was mitochondrial. The poly(A)-containing RNA sedimented with a peak of about 18S, with much material of higher *s* value. After denaturation at 70 C for 5 min, the poly(A)-containing RNA separated into two components of 12S and 16S on a 5%-20% (wt/vol) sucrose density gradient at 4 C, or at 4 and 25 C in the presence of formaldehyde. Poly(A)-containing RNA synthesized in the presence of ethidium bromide sedimented at 5S-10S in a 15%-33% (wt/vol) sucrose density gradient at 24 C. The poly(A) tail of this RNA was smaller than that synthesized in the absence of ethidium bromide. The size of the poly(A)-containing RNA (approximately 1,300 nucleotides) is about the length necessary for that of mRNA species for the products of mitochondrial protein synthesis observed in this study and by others. (42 references

7174 DUAL LABELING IN STANDARD DNA-RNA HYBRIDIZATION STUDIES USING I-LABELED NUCLEAR RNA AND ^{3}H-LABELED DNA.

(Eng.) Garrett, C. T. (Dept. Pathology, Coll. Medicine, Univ. South Florida, Tampa, FL 33620); McNulty, M. E. *Biochemistry* 15(11) 2466-2472; 1976.

Rat liver nuclear RNA was labeled in vitro with ^{125}I to 400,000-800,000 cpm/μg. DNA-RNA from a rat glial tumor line was labeled to specific activities of 42,000-79,000 cmp/μg. DNA-RNA hybridization was conducted in all solution systems at RNA:DNA ratios of 3.5:1 to 18:1. Comparison of the annealing reactions of pulse-labeled liver nuclear RNA and in vitro ^{125}I-labeled nuclear RNA in saturation, kinetic, and competitive hybridization studies showed them to be essentially the same. Nuclear RNA labele by either tritium or iodine showed a 10-20 times greater concentration of the annealing sequences over that in the microsomal RNA. There were minor differences between the nuclear RNAs in the initial reaction rates and in the magnitude of the decrease in percent hybridization at low levels of unlabeled competitor RNA. This was possibly due to preferenti labeling in pulse-labeled RNA of molecules that wer present in lower concentrations or were transcribed from more frequently repeated DNA sequences than th average population of annealing RNA molecules. The technique has application in systems in which the amount of tissue for RNA extraction is small or in which the system does not permit the obtaining of pulse-labeled RNA. (29 references)

7175 SYNERGISTIC ACTION OF BACTERIAL LIPOPOLYSACCHARIDES ON SERUM-STIMULATED DNA SYNT SIS IN MOUSE EMBRYO FIBROBLASTS.

(Eng.) Smith, G. (Sch. Life Sciences, Univ. Nebraska, Lincoln, NB 68588). *Proc Soc Exp Biol Med* 153(1): 187-192; 197

The effects of lipopolysaccharides (LPS) from *Escherichia coli* on the growth rate of early passa mouse embryo fibroblasts were examined. Primary mouse embryo cell cultures were prepared from 14-16-day-old embryos of out-bred Swiss albino mice. The presence of LPS (20 μg/ml) in the culture medi produced a significant increase in cell number ove those cells grown in the presence of 10% calf seru alone. Controls showed that cells did not grow in the absence of calf serum and that LPS was inactiv alone. In another experiment stationary cultures o mouse embryo fibroblasts were prepared by maintenance in low-serum-containing medium. The culture fluid was changed to a medium containing 0 or 10% serum with and without various concentrations of LPS. DNA synthesis rates in the cultures were measured 18 hr later using a 1-hr pulse of ^{3}H-thymidine. Although LPS had no apparent stimulatory effect in itself, it enhanced the serum stimulation of DNA synthesis almost twofold. These results suggest that LPS is exerting a permissive effect on the cells and allowing more cells to enter the replicative cycle in a given period. Dose-response curves showed that the synergistic effect of LPS is evident at all serum concentrations used and that the LPS has no effect in the absence of serum. Pretreatment with LPS in the absence of serum also resulted in a synergistic effect on the serum stimulation of DNA synthesis. Although this does not rule out the possibility that cell-bound LPS is reacting directly with serum growth factors at the cell surface, it strongly suggests that LPS causes an alteration in the cell membrane that results in a more efficient utilization of growth factors by the cell. Experiments are in progress to determine the LPS effect on DNA synthesis and to establish if this effect is common to all bacterial endotoxins and other similar bacterial products. (15 references)

176 THE REPAIR OF DOUBLE-STRAND BREAKS IN DNA: A MODEL INVOLVING RECOMBINATION. (Eng.)

esnick, M. A. (Div. Genetics, Natl. Inst. for Medi-
al Res., Mill Hill, London WU7, England). *J Theor*
iol 59(1): 97-106; 1976.

model is proposed for the repair of induced dou-
le-strand breaks in DNA that involves a proposed
eteroduplex intermediate and normally occurring
epair enzymes. The model predicts that this repair
an lead to nonreciprocal and/or reciprocal recombi-
ation. Evidence from other studies indicates a
lear correspondence between the production of dou-
le-strand breaks and the occurrence of intragenic
ecombinations. It also describes how enzymatically
nduced double-strand breaks could initiate recombi-
ation without concomitant loss of chromosomal seg-
ents. (37 references)

177 A POSSIBLE INVOLVEMENT OF POLYAMINES IN THE INITIATION OF DNA SYNTHESIS BY HUMAN I-38 AND MOUSE BALB/3T3 CELLS. (Eng.)

Boynton, A.
. (Animal Cell Physiology Group, Div. Biological
ciences, Natl. Res. Council Canada, Ottawa, Canada
IA OR6); Whitfield, J. F.; Issacs, R. J. *J Cell*
hysiol 89(3): 481-488; 1976.

e question of whether the increased synthesis of
lyamines that invariably accompany the initiation
cell growth and proliferation are integral parts,
merely side effects, of proliferation was inves-
igated using human WI-38 and mouse BALB/3T3 cells.
anging the medium or simply adding fresh serum
imulated large proportions of the cells in dense,
iescent populations to start proliferating and
art making DNA after a delay of 10-12 hr. Exposure
BALB/3T3 and WI-38 cultures to methylglyoxal bis(guanylhydrazone) (MGBG), a specific inhibitor of polyamine synthesis, at concentrations of 1.0-500 μM at the time of stimulation reduced or totally blocked the subsequent initiation of DNA synthesis. An MGBG concentration as high as 100 μM was unable to reduce incorporation of 5-^{3}H-uridine into RNA, indicating that the inhibitor's action is restricted to the processes leading specifically to DNA synthesis. Mediation of MGBG action by an actual or functional shortage of spermidine or spermine (but not putrescine), indicating an involvement of these polyamines in DNA synthesis, is suggested by the reduction of the inhibitor's effectiveness by a 1-hr early prereplicative exposure of the treated cells to exogenous spermidine and spermine. Other evidence suggests that the levels of these polyamines during the cell cycle may be maintained by cyclic AMP, a brief accumulation of which immediately precedes an increase in ornithine decarboxylase activity and the initiation of DNA synthesis in several cell types. Thus, a cyclic AMP-triggered interplay of calcium ions, the diamine putrescine, and polyamines may be a principal factor in the control of DNA synthesis and cell proliferation. (45 references)

7178 OXYMETHOLONE EFFECT ON ACUTE MYELOBLASTIC LEUKEMIA CELLS IN VITRO. (Eng.)

Ribas-Mundo, M. (Escuela de Hematologia 'Farreras Valenti,' Hospital Clinico, Faculty Medicine, Univ. Barcelona, Barcelona 11, Spain); San Miguel, J. G.; Rozman, C. *Acta Haematol (Basel)* 55(5): 277-281; 1976.

The direct action of oxymetholone on the DNA synthesis of acute myeloblastic leukemia (AML) cells in vitro was studied. The peripheral blasts of 10 patients, 8 with AML and 2 with chronic myeloblastic leukemia in blast crisis were studied. The DNA synthesis of the leukemic cells with and without oxymetholone was measured by ^{3}H-methylthymidine incorporation determined by liquid scintillation. The results showed a wide variation of DNA synthesis from patient to patient with a range from 2,000 to 40,000 cpm, but no significant difference between test and control cultures. It is concluded that oxymetholone does not increase directly the proliferation capacity of peripheral AML cells cultured in vitro. (16 references)

7179 ENZYMATIC DETERMINATION OF NONRANDOM INCORPORATION OF 5-BROMODEOXYURIDINE IN RAT DNA. (Eng.)

Schwartz, S. A. (Dept. Pathology, Univ. Chicago, Chicago, IL 60637). *Biochemistry* 15(14): 3097-3105; 1976.

Secondary cultures of normal rat embryo cells were synchronized by a double thymidine block and pulsed with 10^{-7} M 5-^{3}H-bromodeoxyuridine (BUdR) or 10^{-7} M ^{3}H-BUdR-thymidine during an entire S phase (7.5 hr). DNA was immediately extracted and purified at the completion of the S phase to examine the pattern of ^{3}H-BUdR incorporation in rat genomes. CsCl density gradient centrifugation revealed that substitution for thymine by bromouracil was less than 7%. Single-strand specific nucleases from *Aspergillus oryzae* and *Neurospora crassa* were allowed to react with native and partially depurinated (24%-29%) ^{3}H-thymidine- and ^{3}H-BUdR-labeled rat DNA samples, and the products were assayed by hydroxylapatite column chromatography. Approximately 4%-6% of the native, nondepurinated rat DNA was hydrolyzed by both nucleases. However, 24%-28% of the partially depurinated, ^{3}H-thymidine-labeled rat DNA was hydrolyzed by both enzymes. Although comparable levels of depurinated, ^{3}H-BUdR-labeled DNA were physically hydrolyzed by both nucleases, nearly 65% of the radioactivity was not recovered. Native and depurinated enzyme-treated DNA samples were reassociated into highly repetitive, middle repetitive, and nonrepetitive nucleotide sequence components. The absolute and relative specific activities of each subfraction of native ^{3}H-thymidine-labeled DNA were comparable. ^{3}H-BUdR was differentially concentrated in the middle repetitive sequences compared to other reiteration frequency types. When depurinated, nuclease-treated DNA samples were similarly fractionated, ^{3}H-BUdR-thymine moieties were uniformly distributed throughout all sequences. However, a differential loss of ^{3}H-BUdR moieties was detected predominantly from the middle repetitive nucleotide fraction. Melting profiles of the renatured DNA samples were characteristic of each respective DNA subfraction regardless of isotopic precursor. The results suggest that ^{3}H-BUdR may be differentially incorporated into A + T-rich clusters of rat DNA, especially in the moderately repeated chromosomal elements. (44 references)

7180 KININ-DESTROYING (KININASE) ACTIVITY OF CULTURED RODENT FIBROBLASTS L-929. (Eng.)

Back, N. (Dept. Biochemical Pharmacology, Sch. Pharmacy, State Univ. New York, Buffalo, NY 14214); Steger, R. *Proc Soc Exp Biol Med* 153(1): 175-179; 1976.

The kinin-destroying (kininase) activity of cultured rodent fibroblasts was investigated. Examination of the smooth-muscle-stimulating activity of incubates containing 1 x 10^6 g synthetic bradykinin and increasing volumes of fibroblast cell extracts (0.025-0.2 ml) demonstrated increased kininase activity with increasing volume of fibroblast extracts. Optimum kininase activity occurred at a pH of 7.0-7.4; no kininase activity was observed at a pH of 5 or lower or at pH 10.0. Incubation of 0.2 ml of the fibroblast cell extract with 1 x 10^6 g bradykinin at 37 C and pH 7.0 for increasing time intervals resulted in total destruction of the kininase within 5 min. Four agents inhibited the kininase activity of fibroblast cell extracts: 1,10-phenanthroline, 2,3-dimercaptopropanol, ε-aminocaproic acid, and 4-aminoethylcyclohexane-1-carboxylic acid. At the highest doses studied (indicated in the parentheses), the following agents had no effect on the fibroblast kinase activity: aprotinin (1,000 U), soya bean trypsin inhibitor (10 mg), lima bean trypsin inhibitor (10 mg), and heparin (2,000 U). The soluble protoplasmic protein fraction of the fibroblast cell contained 64.2% of the kininase activity, the nuclear portion had 20%, and the mitochondrial fraction had 5%. Present data suggest that the fibroblast cell contributes to the overall kinin-enzyme activity associated with tumor tissue. The proliferation of fibroblasts at tumor transplant sites and localization between the growing edges of necrotic areas in solid tumor transplants suggest some relationship with tumor growth mechanisms. (25 references)

7181 SYNTHESIS IN VITRO OF ALDOLASE A BY POLYSOMES OR mRNA OF RAT ASCITES HEPATOMA AH 7974 CELLS. (Eng.)

Sakiyama, S. (Div. Biochemistry, Chiba Cancer Center Res. Inst., Nitona, Chiba 280, Japan); Yoda, K.; Fujimura, S. *Biochem Biophys Res Commun* 72(4): 1271-1277; 1976.

The synthesis of Aldolase A in a cell-free system under the direction of either polysomes or messenge RNA (mRNA) prepared from rat ascites hepatoma AH 7974 cells is reported. Polysomes were prepared using the detergent Nonidet P-40 to disrupt the tumor cells. RNA was extracted from polysomes by th pH 9-phenol method and fractionated by column chrom tography on poly(U)-Sepharose. The purified polysom had high template activities when incubated with th pH 5 fraction of rat liver. The polysomal RNA had high template activities in a wheat germ cell-free system. The in vitro products labeled with ^{14}C-leucine in the polysome-directed system and precipitat by anti-aldolase A antibody appeared as a single major peak after electrophoresis on SDS-polyacrylamide gel. The same results were obtained using the in vitro products synthesized in wheat germ extract by AH 7974 mRNA purified on poly(U)-Sepharose. Although comigration of immunoprecipitated products from both cell-free systems with authentic aldolase A subunits strongly suggests its synthesis in vitro it is still uncertain whether the two enzymes are exactly identical. These findings demonstrate that messenger activity for aldolase A is present in hepatoma cells, the first time that mRNA for the shifted isozyme has been established in tumor cell (18 references)

7182 ROLE OF RIBOSOMAL RNA METHYLASES IN THE REGULATION OF RIBOSOME PRODUCTION IN MAMMALIAN CELLS. (Eng.)

Liau, M. C. (Biochemistry Dep Univ. Texas System Cancer Center, M. D. Anderson Hosp. and Tumor Inst., Houston TX 77030); Hunt, M. E.; Hurlbert, R. B. *Biochemistry* 15(14): 3158-3164 1976.

The different characteristics of nucleolar ribosom RNA (rRNA) methylases of rapidly growing Novikoff ascites tumor cells and resting hepatic cells were studied. The activity of rRNA methylases was stimulated by high-energy precursors of RNA (ribonucleoside triphosphates) and inhibited by degradation products of RNA (ribonucleotides and oligoribonucl tides). The response of methylases from rat Noviko ascites tumor and liver to these metabolites were strikingly different. The highly active tumor enzymes responded preferentially to inhibition by

atabolic metabolites, whereas the less active liver
nzymes responded exclusively to stimulation by
nabolic metabolites. When the activity of rRNA
ethylases were assayed in response to increasing
oncentration of S-adenosylmethionine, the tumor
nzymes responded with a hyperbolic substrate depen-
ence curve and the liver enzymes with a sigmoidal
urve. In the presence of an inhibitory dinucleotide,
pA, the tumor enzymes responded with a sigmoidal
urve, in the presence of a stimulator, (ATP), the
iver enzymes responded with a hyperbolic substrate
oncentration curve. When normal Sprague-Dawley rats
ere treated with thioacetamide, the liver nucleolar
RNA methylases became responsive to inhibition by
pA and relatively unresponsive to stimulation by
TP. Polyisonatepolycytidylate made the tumor nuc-
eolar rRNA methylases become unresponsive to inhib-
tion by ApA and more responsive to stimulation by
TP in tumor bearing rats. Increases in methylation
fficiency in vivo was correlated with increased
tability to nucleolar RNA during incubation in
itro, or vice versa. These results suggest that
RNA methylases are regulated by cellular metabolites
uring the nucleolar biosynthesis of ribosomes and
hat rRNA methylases may provide a favorable site
or selective action by cancer chemotherapeutic
gents. (36 references)

183 HUMAN CORREXONUCLEASE: PURIFICATION AND PROPERTIES OF A DNA REPAIR EXONUCLEASE
ROM PLACENTA. (Eng.) Doniger, J. (Dept. Biochemis-
ry, Brandeis Univ., Waltham, MA 02154); Grossman,
J Biol Chem 251(15): 4579-4587; 1976.

exonuclease that hydrolyzes single-stranded DNA
s purified from human placenta. It initiated hy-
rolysis at both the 3' and 5' termini of such DNA
th equal facility, yielding 5'-phosphorylated
igonucleotides averaging four nucleotides in
ngth. These oligonucleotides were released from
th termini at equal rates with the same size dis-
ribution. Although not detectably active against
tact native DNA, it could initiate hydrolysis at
ngle-stranded breaks, creating a gap 30 to 40
cleotides long. If a pyrimidine dimer is adjacent
this break, the enzyme, by virtue of its action
internal phosphodiester bonds, could excise such
mers. The enzyme was termed human correxonuclease
cause of its excision capability. (32 references)

84 INCREASED ADENYLOSUCCINASE ACTIVITY IN HEPATOMAS AND KIDNEY TUMORS.
(Eng.) Jack-
n, R. C. (Lab. Experimental Oncology, Indiana
iv. Sch. Medicine, Indianapolis, IN 46202); Morris,
P.; Weber, G. *Life Sci* 18(10): 1043-1048; 1976.

enylosuccinase activity was measured in adult,
onatal, and regenerating liver, in nine transplant-
le hepatomas of different growth rates, in kidney
rtex and in two transplantable kidney tumors in
e rat. Hepatomas 3924A and 3683 were carried in
I/N rats; the other tumors were in Buffalo rats.
e activity was increased 1.4- to 2.2-fold in all
the tumors, irrespective of the growth rate or the degree of histological differentiation of the neoplasms. Adenylosuccinase activity in the average liver cell of 1-day-old rats was 21% of the adult value. The enzyme activity did not change in the rapidly growing regenerating adult liver. It is concluded that the consistent elevation of adenylosuccinase activity in the tumors was linked with neoplastic transformation; the increase was not observed in nonmalignant proliferating cells. (18 references)

7185 REGENERATING RAT LIVER DNA POLYMERASES: DISSIMILITUDE OR RELATIONSHIP BETWEEN NUCLEAR AND CYTOPLASMIC ENZYMES?
(Eng.) de Recondo, A. M. (Unite d'Enzymologie-Institut de Recherches Scientifiques sur le Cancer, B. P. n 8-94800. Villejuif, France); Abadiedebat, J. *Nucleic Acids Res* 3(8): 1823-1837; 1976.

The possible relationship between the nuclear and cytoplasmic DNA polymerases of regenerating rat liver was studied by sucrose gradient analysis, salt dissociation, and with specific inhibitors. After aqueous subcellular fractionation and removal of the nuclear membranes, three species of DNA-dependent DNA polymerases were characterized: a) a DNA polymeraseβ in the nuclei; b) a DNA polymerase-α in the cytosol that was not dissociated at high salt concentrations; and c) an intermediate form in the cytosol and in the Triton wash containing the nuclear membranes. The latter form behaved like DNA polymerase-α at low salt concentrations but was dissociated at high salt concentrations to a low molecular weight species with properties like DNA polymerase-β (resistance to inhibition by N-ethylmaleimide, heparin and KCl). In vitro reassociation experiments suggest that this intermediate form corresponds to the association of DNA polymerase-β with a membrane component or cytoplasmic protein(s) that appear(s) in regenerating rat liver. (29 references)

7186 LOCALIZATION OF β-GLUCURONIDASE ACTIVITY IN SECTIONS AND CULTURES OF HUMAN GLIOMAS.
(Eng.) Szaniawski, W. (Medizinische Klinik Universitaet Essen, D-4300 Essen 1, Huflandstrasse 55, West Germany). *Acta Neuropathol* 34(1): 47-54; 1976.

The histochemical activity of β-glucuronidase in sections and cultures of human gliomas was studied. Twenty-eight gliomas classified according to the Gluszcz's system were studied: three mature orthoplastic gliomas (IA), two immature orthoplastic gliomas (IIA), seven immature anaplastic gliomas (IIB), six malignant anaplastic gliomas (IIIB), five immature dysplastic gliomas (IIC) and five malignant dysplastic gliomas (IIIC) types. No significant difference was found between (IIC) and (IIIC). Uniform enzyme patterns were also found in anaplastic (B) and orthoplastic (A) gliomas. However, gliomas classified as malignant (III) revealed evident differences in enzyme activity between dysplastic (IIIC) and anaplastic (IIIB) groups. Similar differences were found when immature (II) gliomas or orthoplastic (IIA), anaplastic (IIB), and dysplastic (IIC) types were compared. Thus, differences of β-glucuronidase activity depend not on the degree of differentiation of the gliomas, but on their growth pattern. The high β-glucuronidase activity in the dysplastic gliomas may reflect prevalent degenerative tendencies within this group. The findings of this study parallel earlier observations of a more indolent clinical course of malignant dysplastic gliomas (IIIC) compared with malignant anaplastic gliomas (IIIB). (20 references)

7187 LYSOZYME SYNTHESIS BY ESTABLISHED HUMAN AND MURINE HISTIOCYTIC LYMPHOMA CELL LINES. (Eng.) Ralph, P. (Sloan-Kettering Inst. Cancer Res., Rye, NY 10580); Moore, M. A.; Nilsson, K. *J Exp Med* 143(6): 1528-1533; 1976.

A human cell line was established in culture from a histiocytic lymphoma patient that synthesized and secreted the monocyte-granulocyte specific enzyme lysozyme. The line lacked immunoglobulin and Epstein-Barr virus genome, but bore receptors for immunoglobulin and complement. Eighteen other human cell lines with characteristics of T lymphocyte, B lymphocyte, Burkitt's lymphoma, non-Burkitt's lymphoma, myeloma, and bone marrow epithelial cells were not associated with lysozyme. Among murine cell lines, lysozyme was produced by three histiocytic lymphoma or macrophage lines, a myelomonocytic leukemia line that also secretes myeloid colony-stimulating factor, and a spontaneous lymphoma and an Abelson leukemia virus-induced lymphoma. Lysozyme-negative lines include another Abelson lymphoma, myelomas, T lymphomas, and mastocytoma. (29 references)

7188 THE EFFECT OF ENZYMES UPON METABOLISM, STORAGE, AND RELEASE OF CARBOHYDRATES IN NORMAL AND ABNORMAL ENDOMETRIA. (Eng.) Hughes, E. C. (325 Univ. Ave., Syracuse, NY 13210). *Cancer* 38(1): 487-502; 1976.

The activity of endometrial enzymes was compared in 252 patients with normal menstrual histories and in 156 patients, all over the age of 40, with abnormal uterine bleeding. Material was obtained by endometrial biopsy or curettage. In the pathologic classification of the second group, 30 patients had secretory endometria, 88 patients had endometria classified as proliferative, 24 were classified as endometrial hyperplasia, and 14 were classified as adenocarcinoma. Glycogen synthetase activity caused synthesis of glucose to glycogen, increasing in amount until midcycle, when glycogen phosphorylase activity caused the breakdown to glucose during the regressive stage of endometrial activity. This normal cyclic activity did not occur in the abnormal endometria, where the activity of both enzymes continued at a low constant tempo. Only the I form of glycogen synthetase increased as the tissue became more hyperplastic. With the constant glycogen content and the increased activity of both the TPN isocitric dehydrogenase and glucose-6-phosphate dehydrogenase in the hyperplastic and cancerous endometria, tissue energy was created, resulting in abnormal cell proliferation. These altered biochemical and cellular activities may be the basis for malignant cell growth. (27 references)

7189 THE BEHAVIOR OF MONOAMINOOXIDASE (MAO) ACTIVITY IN TUMORS. I. MAO ACTIVITY MEASURE MENT IN EXPERIMENTAL TUMORS. (Ger.) Kaminski, K. (Zaklad Biochemii, Instytut Biol.-Fizj., Slasjiej Akademii Medycznej, 41-808 Zabrze, Ul. K. Marksa 19, Poland); Bodziony, J.; Matuszewski, W.; Winter, R.; Waronski, W. *Arch Geschwulstforsch* 46(5): 360-364; 1976.

Monoaminooxidase (MAO) activity was assayed in eight female BDF1 mice after ip implantation of leukemia L-1210 and sarcoma S-180. High MAO levels were found in peritoneal S-180 ascites, normal levels in liver homogenates. The MAO activity in L-1210 liver homogenates was also normal. (13 references)

7190 MAINTENANCE OF MICROSOMAL CYTOCHROMES B_5 AND P-450 IN PRIMARY CULTURES OF PARENCHYM LIVER CELLS ON COLLAGEN MEMBRANES. (Eng.) Michalopoulos, G. (Dept. Oncology, McArdle Lab. Cancer Res., Univ. Wisconsin, Madison, WI 53706); Sattler, G. L.; Pitot, H. C. *Life Sci* 18(2): 1139-1144; 1976.

The hepatocyte levels of microsomal cytochromes b_5 and P-450 in the presence or absence of hydrocortisone were studied as a function of hepatocyte age in culture on floating collagen membranes. The cytochromes were maintained for periods of at least 10 days at levels readily measured by conventional techniques and comparable to those of liver in vivo. Addition of high concentrations of hydrocortisone (10^{-4} M) to the culture medium for periods up to 10 days resulted in further increases in the cytochrome levels. Cells cultured in the presence of hydrocortisone showed increased cytochrome P-448 activity after 5 days of culture, while the activity declined after 5-10 days in cells cultured in the absence of hydrocortisone. The steroid caused the absorption maximum of this cytochrome to shift from 449.4 nm to 448.0 nm. (15 references)

7191 PLASMA DEHYDROEPIANDROSTERONE CONCENTRATION IN NORMAL WOMEN AND IN PATIENTS WITH BENIGN AND MALIGNANT BREAST DISEASE. (Eng.) Thomas, B. S. (Dept. Clinical Endocrinology, Imperial Cance Res. Fund Labs., Lincoln's Inn Fields, London, WC2A 3PX, England); Kirby, P.; Symes, E. K.; Wang, D. Y. *Eur J Cancer* 12(5): 405-409; 1976.

Plasma dehydroepiandrosterone (DHEA) concentrations were studied in 35 women with benign breast disease 65 women with early breast cancer, and 35 women with advanced breast cancer by a new gas chromatographic ethod with electron capture detection. Significantly ower values were found in both early and advanced isease than in normal women. Likewise, a similar bservation was made in younger women (age range 0-39 yr) with benign breast disease. No significant orrelation was found between plasma DHEA and plasma HEA sulfate concentrations or between plasma DHEA nd urinary 11-deoxy-17-oxosteroids. This indicates hat measurement of plasma DHEA may be a useful ndependent parameter in the study of breast cancer. 20 references)

192 ECTOPIC AND EUTOPIC SECRETION OF CHORIONIC GONADOTROPIN AND ITS SUBUNITS IN VITRO: OMPARISON OF CLONAL STRAINS FROM CARCINOMAS OF LUNG ND PLACENTA. (Eng.) Lieblich, J. M. (Clinical Endo- rinology Branch, Natl. Inst. Arthritis, Metabolism, nd Digestive Diseases, Natl. Insts. Health, Public ealth Service, U. S. Dept. Health, Education, and elfare, Bethesda, MD 20014); Weintraub, B. D.; rauth, G. H.; Kohler, P. O.; Rabson, A. S.; Rosen, . W. *J Natl Cancer Inst* 56(5): 911-917; 1976.

uman placental hormones such as chorionic gonad- ropin (HCG) and placental lactogen (HPL) are pro- uced eutopically in vivo by neoplasms of the pla- enta. Since these proteins can be detected in the erum of men or nonpregnant women, they can be used s markers for cancer in these individuals and to ollow the course of disease in certain cases. The ecretion rates in vitro of HCG and its subunits and β by the established clonal cell lines of a ronchogenic carcinoma (ChaGo) and a choriocarcinoma EG) were compared. Clones showing the highest ecretion rates of either HCG or its subunits were tudied: ChaGo-K1, a new clonal strain, and ChaGo-C5 nd JEG-3, two previously reported clonal lines. ells were grown under identical conditions in the ame laboratory. Hormone and subunit concentrations ere measured by radioimmunoassays. ChaGo-K1 and haGo-C5 secreted only the α-subunit, whereas JEG-3 ecreted only HCG. Average peak secretion rates in comoles per day per milligram of protein were: for haGo-K1, HCG < 0.3, $\alpha = 290$, and $\beta < 0.5$; for ChaGo- , HCG < 0.3, $\alpha = 21$, and $\beta < 0.5$; and for JEG-3, G $= 18$, $\alpha < 0.7$, and $\beta < 0.5$. The ChaGo-K1 secre- on rate of α was greater than that of any previous- reported ChaGo clones. Significant quantities of tradiol and progesterone accumulated in the media all three cell lines; however, only JEG-3 secre- d detectable quantities of HPL. Thus under identi- l culture conditions, a bronchogenic carcinoma onal line secreted only the α-subunit, whereas a oriocarcinoma line secreted only HCG. These find- gs imply that there are major differences in cellu- r control mechanisms. Moreover, the ectopic secre- ons of α exceeded the eutopic trophoblastic secre- on of HCG, which suggested that in certain cases topic protein production may be even more efficient an nonectopic production. (57 references)

93 A MATHEMATICAL MODEL OF THE ACUTE MYELOBLASTIC LEUKEMIC STATE IN MAN. (Eng.) Rubinow, S. I. (Graduate Sch. Medical Sciences, Cornell Univ., NY 10021); Lebowitz, J. L. *Biophys J* 16(8): 897-910; 1976.

7194 HUMAN NEOPLASTIC AND NORMAL CELLS IN TISSUE CULTURE. I. CELL LINES DERIVED FROM MALIGNANT MELANOMAS AND NORMAL MELANOCYTES. (Eng.) Giovanella, B. (Cancer Res. Lab., St. Joseph Hosp., Houston, TX 77002); Stehlin, J. S.; Santamaria, C.; Yim, S. O.; Morgan, A. C.; Williams, L. J.; Leibovitz, A.; Fialkow, P. J.; Mumford, D. M. *J Natl Cancer Inst* 56(6): 1131-1142; 1976.

7195 HUMAN COLONIC ADENOCARCINOMA CELLS. I. ESTABLISHMENT AND DESCRIPTION OF A NEW LINE. (Eng.) Tom, B. H. (Lab. Surgical Immunology, Northwestern Univ. Medical Center, Veterans Admin. Lakeside Hosp., Chicago, IL 60611); Rutzky, L. P.; Jakstys, M. M.; Oyasu, R.; Kaye, C. I.; Kahan, B. D. *In Vitro* 12(3): 180-191; 1976.

7196 FLUORESCENT CYTOCHEMISTRY OF CALID AND ALGID NORMAL AND LUCKE TUMOR-BEARING KIDNEYS. (Eng.) Harrison, F. W. (Dept. Anatomy, Albany Medical Coll. Union Univ., Albany, NY 12208); Zambernard, J.; Cowden, R. R. *Acta Histochem (Jena)* 54(2): 295-306; 1975.

7197 PREDICTION OF RELAPSE AND REMISSION IN AML BY MARROW CULTURE CRITERIA. (Eng.) Moore, M. A. (Sloan-Kettering Inst. for Cancer Res., 410 East 68th St., New York, NY 10021). *Blood Cells* 2(1/2): 109-124; 1976.

7198 STIMULATION BY SERUM OF THE PHOSPHORYLATION REACTIONS IN DENSITY-INHIBITED 3T3 CELLS. (Eng.) Jullien, M. (Institut de Recherches Scientifiques sur le Cancer, 94 800 Villejuif, France); Harel, L. *Exp Cell Res* 97(1):23-30; 1976.

7199 BIOLOGICAL PROFILE OF AMel 3 (FORTNER) TUMOR IN HAMSTERS (Meeting Abstract). (Ger.) Burns, G. (No affiliation given); Guttner, J.; Fahlbusch, B.; Peker, J.; Wohlrab, W.; Zaumseil, R.-P. *Dermatol Monatsschr* 161(7): 586-587; 1975. (No references)

7200 PULSED NUCLEAR MAGNETIC RESONANCE STUDY OF ^{17}O FROM $H_2{}^{17}O$ IN RAT LYMPHOCYTES. (Eng.) Shporer, M. (Dept. Isotope Res., Weizmann Inst. Science, Rehovot, Israel); Haas, M.; Civan, M. M. *Biophys J* 16(6): 601-611; 1976.

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AARONSON, S. A. 6857
ABADIEDEBAT, J. 7165
ABBOTT, V. 6750*
ABDEL-RAHMAN, M. O. 6688
ABELEV, G. I. 6845
ABLASHI, D. V. 6913*
ABRAHAM, K. A. 7171
ACEVEDO, H. F. 7003
ADAMS, D. O. 6651*
ADAMSON, R. H. 6725*
ADELSTEIN, S. J. 6818*
ADLER, V. V. 6677, 6687
AGRAWAL, V. P. 6744*
AGTHE, O. 6721
AHEARN, M. J. 7154
AHMED, A. 6996
AKIBA, H. 6794
AKIMOV, A. A. 6807*
AKIN, F. J. 6681, 6693
AL-ADNANI, M. S. 6660*
AL-KHATEEB, S. F. 6921
ALBERT, R. E. 6813*, 6814*
ALBRIGHT, J. W. 6938*
ALEXANDER, P. 6620
ALEXANDER-WILLIAMS, J. 7108
ALLAN, T. 6911*
ALLEN, W. P. 6914*
ALLET, B. 6861
ALTHOFF, J. 6680, 6684
ALY, O. A. 6688
AMBROSE, E. 7153
AMBROSIUS, D. 6701
AMBUS, U. 6927
ANDERSEN, H. C. 7115
ANDJELKOVIC, D. A. 7123
ANDREWS, A. D. 6796
ANTOKU, S. 6811*
APPLEBY, A. 6737*
ARCEMENT, L. J. 6890*
ARCHER, V. E. 7116, 7119, 7144*
ARKHANGELSKY, V. V. 7126*
ARLINGHAUS, R. B. 6890*
ARMSTRONG, G. R. 6913*
ARNOLD, W. 6989
ARRIGHI, F. E. 7056*
ARTAMONOV, V. I. 6632
ARTHUR, L. O. 6847
ASHER, Y. 6871, 6873
ATERMANN, K. 6723*
ATKINS, H. L. 6636
ATLAS, S. A. 6692
AUERBACH, O. 7144*
AUJAME, L. 7173
AURELIAN, L. 6872
AUSTIN, S. D. 7143*
BA, S. 7017
BACHENHEIMER, S. 6865
BACHOFEN, H. 7112
BACK, N. 7180
BAGBY, G. C. 6628
BAILEY, J. M. 6911*
BAKER, R. S. 6883*
BALBONI, P. G. 6859
BALE, W. F. 6924
BALL, J. 7085*
BALLARD, A. C. 7037*
BALTIMORE, D. 6884*
BALUDA, M. A. 6828
BAMBERG, M. 7105
BAN, S. 6778*
BANDHAUER, K. 7030*
BANE, G. W. 6985
BARBANTI-BRODANO, G. 6859
BARKAS, T. 6921
BARLOW, J. 6784*
BARR, R. D. 6616
BARRETT, S. F. 6796
BARTLEY, P. C. 6920
BARTRAM, C. P. 7057*
BASERGA, A. 7098
BASERGA, R. 7166
BASSANI, B. 6810*, 6822*
BAUER, G. E. 6726*
BEATHARD, G. A. 6956
BECHTEL, R. C. 7143*
BECKER, Y. 6871, 6873
BEHARI, J. R. 6673
BELAND, F. A. 6698
BELAND, J. E. 7035*
BELL, J. D. 6956
BEN DAVID, E. 6999
BEN-ZEEV, A. 6873
BENDER, E. 6902*
BENEDICT, W. F. 6758*
BENNER, J. F. 6693
BENNETT, M. 6942*, 6943*
BENOHR, H. C. 6997
BENTVELZEN, P. 6889*
BENTWICH, Z. 6630
BERG, P. 6854
BERK, P. D. 6736*
BERKLEY, R. E. 6712

BERLINER, V. R. 6789*
BERNARD, J. 6613
BERNDT, H. 7113
BERNDT, M. 7133*
BERTELL, R. 7125*
BERTSCHMANN, M. 6627
BEUG, H. 6830
BIAGLOW, J. E. 6777*
BINDER, M. 6912*
BIRAN, S. 7021*
BIRBECK, M. S. 6657*
BIRD, C. C. 6659*
BJORNBERG, A. 7027*
BLACK, M. M. 6894*
BLACKBURN, G. M. 6702
BLANDO, P. 7101
BLEJER, H. P. 7120
BLEJER, J. P. 7119
BLOEMENDAL, H. 6888*
BLOOMER, W. D. 6818*
BLUMER, W. 7147*
BOCKER, W. 7023*, 7024*, 7043*
BODANSKY, O. 6653*
BODZICNY, J. 7189
BOND, J. V. 7053*
BONE, E. S. 6722*, 6724*
BONK, U. 7000
BONNEVIE-NIELSEN, V. 6607
BOONE, C. W. 6937*
BOQUIST, L. 7038*
BORCHERT, P. 6756*
BOREK, E. 7142*, 7170
BORNKAMM, G. W. 6869
BORSOS, T. 6952*
BOSCHETTI, N. V. 6775*
BOUSQUET, W. F. 6779*
BOWMAN, P. D. 6855
BOYNTON, A. L. 7160, 7177
BOYSE, E. A. 6843
BRABY, L. A. 6821*
BRANCACCIO, M. E. 6972
BRANDT, B. L. 6767*
BRANDT, L. 6960
BRASLAWSKY, G. R. 6954*
BRAUN-FALCO, O. 6966
BRAUN, H. J. 6997
BRAUN, W. 6915*
BRAWN, R. J. 6853
BRESLOW, A. 6972
BRESNICK, E. 6697
BRETON-GORIUS, J. 7064*
BRIDGES, B. A. 6603
BRIDGES, J. W. 6749*
BRINKMANN, W. 6994
BROCKHAUS, A. 6751*
BRODNER, O. G. 7029*
BROOKES, P. 6698
BROOKS, A. L. 6816*
BROOKS, S. C. 6787*
BROOME-KARLSSON, A. 6798
BROWN, J. C. 7080*
BROWN, J. M. 6791*
BROWN, L. R. 7014
BUCHWALD, M. 6667
BUFFET, R. F. 6942*
BUFFETT, R. F. 6943*
BULLOCK, W. E. 6652*
BUNCH, J. E. 6712
BURNETT, W. S. 7101
BURNIER, E. 6957
BURNS, F. J. 6813*, 6814*
BURNS, G. 7199*
BURSEY, J. T. 6712
BURTON, D. R. 7157
BUSETTA, B. 6716
BUTLER, E. J. 6911*
BUYSE, M. 7026*
BYRNE, J. C. 6856
CAINES, S. 6923
CALOTHY, G. 6831
CALVIN, M. 6695
CAMERON, E. H. 6788*
CAMPBELL, E. A. 7003
CAPUTO, A. 6859
CARDINALI, G. 6859
CARMEL, R. J. 6791*
CARRELL, H. L. 6685
CARSWELL, J. J. 6973
CAVANAGH, D. 6968
CHAMBERLAIN, W. J. 6681
CHAN, F. 7085*
CHANDEBOIS, R. 7097*
CHANDLER, J. A. 6780*, 6781*
CHANDRA, P. 6875
CHANDRA, S. V. 6673
CHANG, C. 6878*
CHANG, R. S. 6906*
CHANGARIS, D. B. 7047*
CHAZAN, R. 6929
CHEN, S. S. 6974
CHIESARA, E. 6748*
CHOW, N. 6932

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CHRISTEN, H.
7112
CHUNG, E. B.
6743*
CIVAN, M. M.
7200*
CLAYSON, D. B.
6754*
CLEMENS, M. J.
7169
COATES, H.L.
6990
COBIN, R. H.
7045*
COHEN, C. J.
6974
COLE, G. A.
6872
COLE, P. A.
7134*
COLEMAN, M. E.
6765*
COLLINS, J. A.
6970
COLLINS, R. S.
6638
COLMERAUER, M. E.
6944*
COMINO, R.
7025*
CONDRON, C. J.
7062*
CONLEY, F. K.
6770*
COOKSON, K.M.
6789*
COOPER, W. C.
7118
COQUIN, Y.
7064*
CORALLINI, A.
6859
CORCORAN, R.
6790*
CORK, A.
7154
CORREA, P.
6725*
COX, I. S.
6935*
COSTANZI, J. J.
6956
COTRAN, R.
6635
COTTIER, H.
6627
COULAM, C. M.
7014
COURSEILLE, C.
6716
COVELLI, V.
6810*, 6822*
COWDEN, R. R.
7196*
CREASMAN, W. T.
7135*
CREECH, J.
6736*
CROY, R. G.
6699
CRUCHAUD, A.
6957
CUATRECASAS, P.
6637
CUBIE, H. A.
6904*
CURRIE, A. R.
6659*
CURRIE, G.
6621
CURTIS, L. E.
7089*
CYPESS, R. H.
7122
DAHM, K.
7107
DAHME, E.
6772*, 6774*
DALGARD, D. W.
6725*
DALY, T. M.
6892*
DANDLIKER, W. B.
6853
DANENBERG, P. V.
6760*
DANIEL, C. W.
6855
DANIEL, R. W.
6860
DANILUK, A.
6803
DANON, D.
6846
DAOUD, A. H.
6732*
DARNELL, J. E.
6865
DASTOOR, M. N.
6828
DATTNER, A.
6965
DAUPHINEE, M.
6946*
DAVIDSON, N. MCD.
6921
DAVIDSON, R. L.
6870
DAVIES, J. D.
7019
DAVIES, P.
6783*
DAVIS, S.
6995
DAYTON, P.
7101
DE RECONDO, A. M.
7185
DE RUITER, J.
6649*, 7159
DE-THE, G.
6868
DEAKIN, A. S.
7155
DEBUCH, K. E.
6765*, 6766*
DEEN, D.
6715
DEINHARDT, F.
6868
DEINZER, M.
7150*
DELELLIS, R. A.
7089*
DELIUS, H.
6869
DELLING, G.
7067*
DELORIA, L.
6750*
DEMENT, J. M.
7119, 7148*
DENDY, P. P.
7162
DENK, H.
7091*
DEPIEDS, R.
6941*
DEUTSCH, E.
7061*
DEVINE, K. D.
6990
DEWEY, W. C.
6820*
DEYS, B. F.
7146*
DI PAOLA, M.
6810*
DICKE, K. A.
7154
DICKMAN, P. S.
7008
DIEDRICHS, H.
7075*
DIKMAN, S. H.
7045*
DIONNE, G. P.
7035*
DIWAN, B. A.
6692, 6708
DIXIT, P. K.
6726*
DOLAN, Z.
6923
DOLL, R.
6656*
DONIGER, J.
7183
DORMER, P.
6994
DOSTAL, V.
6912*
DOUGLAS, S. D.
6630
DOWALIBY, J. M.
6908*
DOWBEN, R. M.
7171
DREWINKO, B.
6927
DREYFUS, B.
7064*, 7069*
DUBRAVSKY, N.
6803*, 6805*
DUBRAWSKY, C.
6803*
DULOWSKI, W.
6803
DUMONT, J.
6867

DUNCAN, W. P.
6755*
DVORAKOVSKAIA, I. V.
6988
EASTY, D. M.
6658*
EASTY, G. C.
6658*
ECKERT, W. R.
6672
ECONOMOU, G. E.
6937*
EDENHARDER, R.
6665
EDWARDS, W.
6782*
EGGER, H.
7136*
EICHEN, R.
7107
EIKHOM, T. S.
7171
EL-DIB, M. A.
6688
ELGJO, K.
6761*
ELKINGTON, J.
6866
ELSTEIN, M.
6788*
ELTZE, M.
6765*, 6766*
EMMINGER, E.
7094*
ENERBACK, L.
7156
ENGEL, J. F.
6755*
ENGELHARDT, N. V.
6845
ENRIGHT, F. M.
6914*
EREMKINA, E. I.
6925
ERFLE, V.
6896*
ERICKSON, J.
6740*
ERSHOFF, B. H.
6742*
ESCHER, M.
6610
ESKIN, B. A.
7140*
EVANS, D. M.
7019
EYAL, Z.
7021*
EYLAN, E.
6874
FABRICIUS, H. A.
6826*
FAHLBUSCH, B.
7199*
FAHRLANDER, H.
6614
FALK, H.
6736*
FALK, L.
6868
FALOR, W. H.
6993
FARBER, F.
6728*
FARBER, P. A.
6885*
FARHI, F.
7045*
FARMER, J.
6676
FEINGOLD, N.
6867
FEINSTEIN, A.
6953*
FELDMAN, P. S.
6991
FERRELL, J. F.
6738*
FIALKOW, P. J.
7074*, 7194*
FIDLER, I. J.
6923
FILLINGAME, R. A.
6906*
FINE, D. L.
6847
FINE, G.
6984
FINK, L. M.
6758*
FINKELBERG, R.
7078*
FIRKET, H.
6940*
FISCHER, D.
7009
FISCHER-FANTUZZI, L.
6851
FISHER, M. S.
6936*
FLECKENSTEIN, B.
6869
FLETCH, A. L.
6747*
FLOYD, R. A.
6678
FOLKMAN, J.
6635
FOWLER, A. K.
6898*
FOX, C. F.
6955*
FOX, W.
6706
FRANK, D.
6785*
FRANKLIN, M. R.
6690
FRANKS, L. M.
7095*
FRANZEN, L.
7156
FRAUMENI, J. F.
6612
FREEMAN, K. B.
7173
FRENSDORFF, A.
6954*
FREUND, H.
7021*
FRICH, J. C.
7003
FRIEDMAN, H.
6885*
FRIEDMAN, J. M.
7074*
FRIEDMAN, M. A.
6764*
FRIEDMANN, A.
6871
FRIEND, C.
6836
FRITH, C.
6676
FRITH, C. H.
6727*
FRITZ, S.
6715
FROHBERG, H.
7145*
FRY, F. A.
6797
FUJIMURA, S.
7181
FUKUHARA, S.
7060*
FUNDER, J. W.
6784*
GAGEL, R. F.
7089*
GAGLIANO, R. G.
6956
GALLAGHER, H. S.
7135*
GALLO, R. C.
6622, 6897*, 6899*,
6900*
GANS, J. H.
6707
GARATUN-TJELDSTO, O.
7171
GARCIA-VALDECASAS, R.
7025*
GARDNER, A.
6758*
GARON, C. F.
6856
GARRETT, C. T.
7174
GARVIN, A. J.
6977
GEIL, R. G.
6789*
GELBOIN, H. V.
6699
GEMPERLE, A.
7113
GEMPERLE, I.
7113
GENTON, C.
7142*
GEORGII, A.
6901*, 6933*, 7004,
7037*
GEORGSSON, G.
6917*
GERSHON, R. K.
6947*

GERSHWIN, M. E.
6996
GERSHWIN, R. J.
6996
GHAHREMANI, G. G.
7036*
GHOSH, B.
6743*
GIBEL, W.
6734*
GILLAM, J. D.
7116, 7119
GILLAN, D. J.
7161
GILLESPIE, D.
6699*
GILLESPIE, E.
6900*
GILMORE, J.
7003
GINGELL, R.
6680
GIORDANA, M. T.
6768*
GIOVANELLA, B.
7194*
GIVOL, D.
6951*
GLANZ, H.
7042*
GLASAUER, F. E.
7130*
GLASENAPP, U.
7020*
GLASER, M.
6850, 6919
GLASSY, F. J.
6906*
GLOVER, E. L.
6686
GLUSKER, J. P.
6685
GOEL, B. B.
6744*
GOERTTLER, K.
6745*
GOHRBAND, G.
7018
GOLDBLATT, L. I.
6986
GOLDENBERG, D. M.
6975
GOLDER, M. P.
6783*
GOLDFARB, P.
6965
GOLDMAN, M.
6816*
GOLDSTRAW, P.
7034*
GOLOMB, H. M.
6629
GONZALEZ-CRUSSI, F.
7052*
GORDAN, G. S.
6604
GORTTLER, K.
6746*
GOSSNER, W.
6896*
GOTH, R.
6771*
GOULD, V. E.
7001
GRABNER, G.
6611
GRAF, T.
6830
GRAFFI, A.
6902*
GRANDJEAN, C. J.
6763*
GRANOFF, A.
6334
GRANTHAM, P. H.
6730*
GRASSO, R.
6602
GREEN, W. R.
7054*
GREENBERG, B. G.
6604
GREENWALD, P.
7101
GRIFFIN, A. C.
6732*
GRIFFITHS, K.
6783*, 7019
GRIPS, K. H.
6958
GRONDAHL, R. D.
7144*
GROOM, G. V.
6780*, 6788*
GROSSI, M. P.
6859
GROSSMAN, L.
7183
GRUNFELD, K.
7106
GUENTHNER, T.
6750*
GUTENSOHN, N.
6615
GUTHERT, H.
7099, 7100
GUTMAN, A.
6999
GUTTNER, J.
7199*
HAAS, M.
7200*
HAASE, A. T.
6618
HALEY, T. J.
6676
HALLIDAY, W. J.
6920
HALPERN, M. S.
7080*
HAMMAN, J. P.
6757*
HANANIAN, J.
7062*
HANDLER, A. H.
6762*
HANICHEN, T.
6769*
HANLEY, P. H.
6654*
HANRAHAN, L. R.
7101
HANSCHE, G.
7113
HANSCHE, R.
7113
HARAN-GHERA, N.
6929
HARBACH, P. R.
6713
HARDY, J.
6602
HARDY, M. A.
6965
HAREL, L.
7198*
HARRIS, S. E.
6720
HARRISON, F. W.
7196*
HARSHBARGER, J. C.
6985
HARTMAN, C. T.
7026*
HARVEY, H. R.
7047*
HARVEY, R. G.
6698
HAUSWALDT, C.
6959
HAYAMI, M.
6832
HAYESLIP, D. W.
7003
HAYMAN, M. J.
6833
HAYNIE, T. P.
6817*
HEFTER, K.
6812*
HEGEMANN, F.
6994
HEIDELBERGER, C.
6760*
HELLMAN, A.
6898*
HEMPEL, K.
7167
HEMPELMANN, L.
7101
HENDERSON, W. J.
7019
HENI, N.
6826*
HENLE, W.
6867
HENNEKEUSER, H. H.
6826*
HENRICHS, H.
6826*
HENRY, M. M.
7052*
HENSHAW, E. D.
7169

HERBERMAN, R. B.
6850, 6919
HERMAN, M. M.
6770*
HERRMANN, J.
6983
HERSH, E. M.
6927
HESS, M. W.
6627
HETRICK, F. M.
6916*
HEUSON, J. C.
6682
HEUSON-STIENNON, J.
6682
HEYDEN, H. W.
6997
HEYDEN, S.
6610
HIGASHI, K.
7065*
HIGGINSON, J.
6661*
HILGERS, J.
6868
HILL, B. T.
6655*
HILL, K.
7083*
HILL, M. J.
6724*
HINZ, W.
7023*, 7024*
HIRAKI, K.
7068*
HIRANO, T.
6679
HIRAYAMA, T.
7117
HIROKAWA, K.
6938*
HOAGLAND, P. M.
6930
HOAR, D. I.
7078*
HOCKER, P.
7061*
HOFER, K. G.
6819*
HOFFKEN, K.
7075*
HOFFMAN, F.
6734*
HOHAMEDI, S.
7164
HOHN, P.
6739*, 7092*
HOLDEN, H. T.
6850
HOLLENBERG, M. D.
6637
HOLLEY, R. W.
6646*
HOLM-HADULLA, M.
7127*
HOLMES, F. F.
7134*
HOLSCHER, M.
6669
HOLTZ, J. K.
6853
HOLZNER, J. H.
7091*
HOMBURGER, F.
6762*
HOMMEL, G.
7136*
HONORATI, C.
6859
HORI, Y.
6799
HORIKAWA, M.
6778*
HORLAND, A. A.
6964
HORN, K. H.
6734*
HOSHINO, M.
7071*
HOSPITAL, M.
6716
HOSSFELD, D. K.
7075*
HOVADHANAKUL, P.
6968
HOWARD-FLANDERS, P.
6815*
HOWARD, R.
6790*
HOWELL, L.
6909*
HOWLEY, P. M.
6856
HSUEH, S. S.
6762*
HUANG, P. H.
6714
HUBERMAN, E.
6641
HUBNER, G.
6966
HUDSON, C.
6858
HUGHES, E. C.
7188
HUNT, M. E.
7182
HUNTER, E.
6833
HUNTER, N.
6803*, 6805*
HURD, C. M.
6931
HURLBERT, R. B.
7182
HURTUBISE, P. E.
7070*
HUSBY, G.
6930
ICHIKAWA, M.
6729*
ICHIKAWA, Y.
6729*
IDOINE, J. B.
6730*
IEVLEVA, E. S.
6845
IHLE, J. N.
6847
IMMELMAN, A. R.
7165
INFANTE, P. F.
6735*
INGLES, C. J.
6667
IRVINE, W. J.
6921
ISAKSSON-FORSEN, G.
7157
ISHIGAMI, S.
6729*
ISHIZUKA, M.
6915*
ISSACS, R. J.
7177
ITO, M.
6832, 7093*
IVANKOVIC, S.
6705
IVERSEN, O. H.
6761*, 7157
IWAI, M.
6838, 6842
IWAI, Y.
6838, 6842
IWASAKI, K.
6691
IZZO, M. J.
6924
JABLON, S.
6825*
JACKISCH, R.
6765*, 6766*
JACKSON, C. M.
6679
JACKSON, R. C.
7184
JACOBS, R. P.
6872
JACOBSON, B.
6777*
JACOBSON, C. B.
6671
JAGER, S.
7099
JAGLA, K.
7004
JAKOBIEC, F. A.
6981
JAKSTYS, M. M.
7195*
JAMJOOM, G. A.
6890*
JANSEN, J.
6649*
JAO, W.
7022*
JAQUES, W. E.
6676
JEFFERY, E.
6750*
JENNER, D. A.
6788*

JOCHMANN, G.
7145*
JOHNSON, B. J.
6945*
JOHNSON, D.
6868
JOHNSON, G. R.
6949*
JONES, P. A.
6758*
JOSEY, W. E.
6617
JUDD, H. L.
6786*
JUDGE, D. M.
7008, 7047*
JULLIEN, M.
7198*
JUNG, A.
6765*, 6766*
JURASKE, P.
6989
KAHAN, B. D.
7195*
KAINA, B.
6773*
KALICH, J.
6772*, 6774*
KAMADA, N.
6802
KAMINO, K.
7017
KAMINSKI, K.
7189
KAPADIA, G. J.
6743*
KAPLAN, H. S.
6839, 6840
KAPLAN, J.
6928
KAPLAN, M. M.
7089*
KARSHIN, W. L.
6890*
KATENKAMP, D.
7090*
KATO, R.
6691
KATO, T.
6794
KAUFMAN, E. R.
6870
KAWAMURA, T.
7017
KAYE, C. I.
7195*
KELLEN, J. A.
6747*
KELLY, T. J.
6860
KENYON, K. R.
7054*
KERN, D. H.
6932
KERSTING, G.
7050*
KHILANANI, P.
7073*
KILIAN, D. J.
6671
KILLMANN, S. A.
6623
KIMES, B. W.
6767*
KING, G. W.
7070*
KING, H. W.
6698
KIRBY, P.
7191
KIRCHNER, H.
6850
KISILEVSKY, R.
6741*
KITABATAKE, T.
7114
KITAJIMA, K.
7068*
KLAHR, G.
6848
KLAIBER, M.
6728*
KLEIN, G.
6719
KLEINMAN, R.
6874
KLIER, F. G.
6767*
KLIMISCH, H. J.
6701
KLINMAN, N. R.
6922, 6948*
KLINOVA, E. G.
6925
KLUG, H.
7087*
KNAUF, S.
6926
KNOPF, U. C.
7168
KNYSZYNSKI, A.
6846
KOCH, C.
6777*
KOCH, C. J.
6808*
KOCK, K.
7062*
KOHLER, P. O.
7192
KOHN, H. I.
6823*
KOLAKOWSKI, D.
6787*
KOLBYE, A. C.
6662*
KOLIN, A.
6747*
KOLWYCK, K. C.
6755*
KORSGAARD, R.
7157
KOSTYK, T. G.
6947*
KOTAKE, A.
6750*
KOTELNIKOV, V. M.
7126*
KOURILSKY, F. M.
6867
KOUTTAB, N. M.
6898*
KOVI, J.
6733*
KOZLOV, A. P.
6807*
KOZUSCHEK, W.
7107
KRAEMER, K. H.
6796
KRAUSE, P. G.
6901*
KRAUSE, P. H.
6933*
KRAUSZ, T.
6979
KRAUTH, G. H.
7192
KRENTZ, K.
7018
KRIPKE, M. L.
6936*
KRISTENSEN, E.
6648*
KROATH, H.
6912*
KROST, K.
6712
KRUGER, F.
6680
KUCHEMANN, K.
7005
KUCHINO, Y.
7170
KUCICH, U. N.
6945*
KUMAGAI, K.
6910*
KUNZE, E.
7031*
KUPPER, R.
6680, 6740*
KUROKAWA, S.
7114
KURUMADO, K.
6895*
KUSCHNER, M.
7144*
KWOCK, L.
6812*
LA PLACA, M.
6859
LABEDZKI, L.
6958
LABROSSE, K. R.
6759*
LACHMANN, P. J.
6951*
LAFONTAINE, N.
6940*
LAITIO, M.
7072*
LAKSHIMI, S.
7110

* INDICATES A PLAIN CITATION WITHOUT ACCOMPANYING ABSTRACT

LAMAR, J. K.
6789*
LAMERTON, L. F.
6664*
LANDOLT, A. M.
7010
LANE, J.
6909*
LANGENHUYSEN, M. M.
7084*
LANZKOWSKY, P.
7063*
LARSSON, S. E.
7038*
LAUDON, E.
7149*
LAUFER, N.
7021*
LAUG, W. E.
6758*
LAVRIN, D. H.
6919
LAWLER, S. D.
7059*
LAWSON, W.
7045*
LEBOWITZ, J. L.
7193*
LECOQ, D.
6961
LEE, J. S.
7120
LEE, S. C.
7052*
LEGROS, N.
6682
LEHMAN, J. M.
6881*, 6978
LEHMANN, C.
7113
LEHNERT, S.
6806*
LEIBOVITZ, A.
7194*
LEJEUNE, F.
6998
LEMEN, R. A.
7119, 7120
LENZ, H.
6987
LEONG, J. A.
6852
LEROY, J. G.
7049*
LESNA, M.
7007
LEVAN, G.
6960
LEVIJ, I. S.
6689
LEVINE, S.
6965
LEVITT, S.
6965
LEVY, B. S.
7149*
LEVY, J. A.
6619
LEWIS, J. W.
6679
LIABEUF, A.
6867
LIAU, M. C.
7182
LIBERTI, P.
6851
LIEBERMAN, M.
6839, 6795, 6840
LIEBLICH, J. M.
7192
LIENER, I. E.
6759*
LILLIAN, D.
6737*
LIN, P. F.
6815*
LINMAN, J. W.
6628
LITMAN, G. W.
6843
LJUNGBERG, C.
7151*
LLOYD, H. M.
6920
LOBB, D. S.
7059*
LOBUGLIO, A. F.
7070*
LOEB, J. E.
7056*
LOEB, L. A.
6674
LOEB, W. F.
6913*
LOHR, G. W.
6826*
LOHS, K.
6734*
LOMBARDI, L.
6717
LONDON, I. M.
7169
LORENTZON, R.
7038*
LORTHOLARY, P.
6998
LOSSNITZER, A.
6848
LUBORSKY, S. W.
6878*
LUCAS, W. E.
6786*
LUETZELER, J.
6913*
LUKES, R. J.
6638
LUZ, A.
6896*
LYONS, L. B.
7163
LYSGAARD-HANSEN, B.
7106
MACDONALD, E. J.
7124
MACKAY, B.
7135*
MAIGNE, J.
6961
MAKAREVSKII, M. F.
6807*
MAKINODAN, T.
6938*
MAKSYMOWICZ, G.
7101
MALDONADO, J. E.
6961
MALICK, L
6684
MALUISH, A. E.
6920
MANDEL, J.
7149*
MANNERING, G.
6750*
MANNERING, G. J.
6694
MANOCHA, K. K.
6800
MANOJLOVIC, N.
6751*
MARCIANI, D. J.
7163
MARCUS, S. L.
6829, 6893*
MARGISON, G. P.
6718
MARIN, J. C.
7041*
MARQUART, K. H.
6896*
MARSHALL, J.
7080*
MARTIN, J. F.
6736*
MARTIN, L. N.
6914*
MARTIN, M. A.
6856
MARTINEZ, W.
6666
MASON, K.
6803*, 6805*
MATHUR, A. K.
6673
MATSUYAMA, M.
7093*
MATSUZAWA, H.
7017
MATUSZEWSKI, W.
7189
MAURELLI, A. T.
6945*
MAVLIGIT, G. M.
6927
MAYER, D.
6765*, 6766*
MAZZONI, A.
6859
MCBURNEY, M. W.
7152
MCCLINTOCK, P. R.
6837
MCCONNELL, I.
6931, 6951*

MCCORMICK, K. J. 6905*
MCCORMICK, N. K. 6905*
MCDONALD, T. J. 6990
MCGEE, J. C. 6660*
MCGRATH, M. 6877*
MCINTIRE, K. R. 6725*
MCMICHAEL, A. J. 7123
MCNULTY, M. E. 7174
MCPHERSON, F. J. 6749*
MEEHAN, T. 6695
MEIER, H. 6708
MEISTRICH, M. L. 6817*
MELTON, R. 7150*
MELVOLD, R. W. 6823*
MENEGUZZI, G. 6862
METALLI, P. 6810*, 6822*
METCALF, D. 6949*
METCALF, E. S. 6948*
METZ, E. N. 7070*
METZLER, C. M. 6947*
MEYER, M. W. 6991
MEYER, N. I. 7013
MEYER, V. 6700
MGBODILE, M. U. 6669
MIAN, T. A. 6817*
MICHALIDES, R. 6887*
MICHALOPOULOS, G. 7190
MIELOT, F. 7079*
MIKI, A. 7017
MIKOCHI, H. 7068*
MILANESI, G. 6862
MILGRAM, J. W. 7039*
MILLER, G. 6908*
MILNE, G. M. 6702
MILNE, J. 6606
MIRONOV, N. M. 6677, 6687
MISFELD, J. 6753*
MISTRY, D. H. 7153
MISUMI, H. 6675
MITCHELL, D. 7150*
MITLEMAN, F. 6960
MIYA, T. S. 6779*
MIYAJI, T. 7109
MOBIUS, W. 6826*
MODAK, M.J. 6829
MODAK, M. J. 6893*
MOHAN, L. C. 6730*
MOHANTY, S. B. 6916*
MOHINDRA, R. K. 6800
MOHR, U. 6680, 7094*
MOLDOW, C. F. 6877*
MONAHAN, J. J. 6720
MOORE, M. A. 7187, 7197*
MORA, P. T. 6878*
MORCHIO, F. J. 7041*
MORGAN, A. C. 7194*
MORI, W. 6895*
MORRIS, H. P. 6679, 6733*, 7184
MORRIS, S. E. 6788*
MORROW, J. 6715
MORROW, R. H. 6615
MORTON, M. S. 6780*
MOSER, K. 7061*
MOSES, D. C. 7044*
MOSKOWITZ, M. 6864
MUCK, B. R. 7136*
MUGGIA, F. M. 6965
MUKADA, T. 7131*
MULDER, C. 6869
MULVIHILL, J. J. 6612
MUMFORD, D. M. 7194*
MUNJAL, D. 7092*
MURCHISON, T. E. 6785*
MURPHY, G. P. 6683
MURPHY, W. M. 6992
MUSIEROWICZ, A. 7016
MYRUP, A. C. 6916*
NAGAYO, T. 7093*
NAGEL, D. 6740*
NAGEL, D. L. 6754*
NAHMIAS, A. J. 6617
NAIB, Z. M. 6617
NAKAMURA, T. 7093*
NAKANISHI, T. 7068*
NAKANO, H. 6794
NARATH, P. 7032*
NARISAWA, T. 6703
NASCA, P. C. 7101
NASO, R. B. 6890*
NATHANSON, N. 6917*
NEBERT, D. W. 6692
NERLAND, D. 6750*
NEWMAN, J. A. 7144*
NEZELOF, C. 7015, 7033*
NICHOLSON, D. H. 7054*
NICHOLSON, R. I. 6783*
NICHOLSON, W. J. 7121
NIEDERMAN, J. C. 6908*
NIES, K. M. 7080*
NILSSON, A. 6798
NILSSON, K. 7187
NILSSON, P. G. 6960

NISHI, K.
7086*
NISHIKAWA, R.
6799
NISHIYAMA, R. H.
7044*
NKRUMAH, F. K.
7102
NOGUCHI, H.
6691
NONOYAMA, M.
6907*
NOOTER, K.
6889*
NORMANN, S. J.
6939*
NORRBY, K.
7156
NOWINSKI, A.
7016
NUERENBERGER, S. P.
6968
NURMINEN, M.
7139*
NUSSBAUM, R.
7055*
NYE, C. A.
6758*
NYORMCI, O.
6866
O'BRIEN, K.
6801
O'CONNOR, P. J.
6718
O'CONOR, G. T.
6624
O'MALLEY, B.
6720
O'MALLEY, F.
7059*
O'SULLIVAN, J. P.
7006
OBATA, Y.
6843
OBERLIN, M. A.
7080*
OBIDITSCH-MAYER, I.
7091*
OCCHIONERO, F.
7000
OCHIAI, T.
6996
OCHS, H.
6958
OHANIAN, S. H.
6952*
OKUMOTO, M.
6838, 6842
OLENOV, IU. M.
6640
OLINICI, C. D.
7048*
OLSEN, C. E.
7172
OREFICE, S.
6859
ORGEE, L.
6702
ORR, T.
6913*
OSAMURA, R. Y.
6984
OSBORNE, M. R.
6698
OSTERTAG, W.
6886*
OTKEN, L. B.
6973
OTTEN, H.
6958
OYASU, R.
7195*
OZANNE, B.
6879*
PAGANO, J. S.
6908*
PAGLIERONI, T.
6906*
PAIN, V. M.
7169
PAINE, A. J.
6696
PALSSON, P. A.
6917*
PALUTKE, M.
7073*, 7076*
PANCAKE, S. J.
6878*
PANEM, S.
6841
PANG, R. H.
6891*
PANITCH, H.
6917*
PAOLETTI, P.
6768*
PAPACONSTANTINOU, J.
6837
PAPE, G. R.
6997
PARK, W. D.
6795
PARKE, D. V.
6749*
PARKER, J. E.
7077*
PARKER, S. E.
6728*
PARMENTIER, C.
7079*
PASQUALINI, C. D.
6944*
PASSARGE, E.
7057*
PASTEELS, J. L.
6682
PATHAK, S.
7056*
PAUL, B. D.
6743*
PEARSON, G. R.
6913*
PEARSON, H. A.
6908*
PEARSON, J.
7149*
PEDRINIS, E.
6627
PEKER, J.
7199*
PELLIZZARI, E. D.
6712
PENHOET, E. E.
7172
PERKINS, I. V.
7102
PERRY, S.
6616
PERTSOV, O. L.
6807*
PESSAC, B.
6831
PETERSON, W. D.
6928
PETO, J.
6706
PETURSSON, G.
6917*
PETZOLD, G. L.
6713
PEZZOTTA, S.
6768*
PFLEIDERER, A.
7002
PHILIP, P. J.
6971
PHILLIPS, D. L.
6668
PHILLIPS, L. A.
6891*
PICCIANO, D. J.
6671
PIETSCHMANN, H.
7164
PIGNATTI, P. F.
6862
PIKE, M. C.
6918
PILCH, Y. H.
6932
PISSAREK, D.
7100
PITOT, H. C.
6631, 7190
PITTERMANN, E.
7061*
PLETSCH, Q. Z.
6975
POLEDNAK, A. P.
7138*
POLLACK, R.
6879*
POLLIACK, A.
6630
POMMIER, G.
6941*
POPPER, H.
6736*
PORT, R.
6705
PORTOLANI, M.
6859
POSSATI, L.
6859

POTT, F.
6752*, 6753*, 6827*
POULIK, M. D.
7076*
POUR, P.
6680, 6684
POWERS, M. B.
6738*
POZHARISSKII, K. M.
6704
PRADHAN, S. N.
6743*
PRASAD, A. S.
7076*
PRATT-THOMAS, H.R.
6977
PRECIGOUX, G.
6716
PREIN, J.
7040*
PREUSSMANN, R.
6705
PRICKETT, M. S.
6715
PUCK, J.
7055*
QUEST, D. O.
7051*
RABIN, H.
6913*
RABSON, A. S.
7192
RADNAY, J.
6999
RAINER, H.
7061*
RAJEWSKY, M. F.
6771*
RALPH, P.
7187
RAMANATHAN, K.
7110
RAMASAMY, R.
6953*
RAMZY, I.
6970
RAMZY, T.
6969
RANGAN, S. R.
6860, 6914*
RAO, M. S.
6711
RECANT, W.
7022*
REDDY, B. S.
6703
REDDY, J. K.
6711
REDMOND, C. K.
7122
REE, G. H.
7111
REEM, G. H.
6836
REESE, D. F.
7014
REGAN, J. D.
6793
REICH, T.
7147*
REISSIG, M.
6860
REITZ, M. S.
6622, 6897*
REMACLE-BONNET, M.
6941*
REMAGEN, W.
7040*
RENNE, R. A.
6738*
RENTON, K. W.
6694
RESNICK, M. A.
7176
REUBER, M. D.
6686, 6731*
REZNIK, G.
7094*
REZNIK-SCHULLER, H.
6709
RIBAS-MUNDO, M.
7178
RICCARDI, V. M.
7058*
RICE, M.
6909*
RICHARDSON, N. E.
6953*
RICO, L. R.
7025*
RIEBER, E. P.
6997
RIESE, U. M.
6826*
RIETHMULLER, G.
6997
RIGBY, P. W.
6852
RILEY, V.
6915*, 6934*
RINGEL, E.
6609
RISCA, R.
7048*
RITTENHOUSE, H. G.
6955*
RITTER, P. J.
6968
RITZMANN, H.
7002
ROBBINS, J. H.
6796
ROBINETTE, C. D.
6825*
ROCKERBIE, R. A.
7077*
ROESCH, W. C.
6821*
ROHRBACH, R.
6761*
ROMSDAHL, M. M.
6935*
ROSCOE, P.
6921
ROSEN, S. W.
7192
ROSENBERG, N.
6884*
ROSENTHAL, L. J.
6863
ROSSNER, A.
7029*
ROSSWICK, R. P.
7006
ROUSSEAU-MERCK, M. F.
7033*
ROWLEY, J. D.
6650*, 6964
ROYER-POKORA, B.
6830
ROZENSZAJN, L. A.
6999
ROZMAN, C.
7178
RUBIN, A. D.
6995
RUBIN, D.
6689
RUBINOW, S. I.
7193*
RUBINSTEIN, L. J.
6770*
RUBIO, C. A.
6976
RUDIGER, K. D.
7099, 7100
RUDOLPH, F. B.
6672
RUMI, L.
6944*
RUOSLAHTI, E.
6647*
RUSSFIELD, A. B.
6762*
RUTZKY, L. P.
7195*
SACCOMANNO, G.
7144*
SACHS, H.
7020*
SACHS, L.
6950*
SACK, H.
7105
SAEGER, W.
7011, 7046*
SAFRONOV, V. A.
7126*
SAGONE, A. L.
7070*
SAITO, R.
6980
SAKAI, K.
7114
SAKATO, J.
7068*
SAKIYAMA, S.
7181
SALAMAN, P. F.
7103
SALCMAN, M.
7051*
SALDEN, M. H.
6888*

SALISBURY, J. G.
6718
SALMON, C.
6626
SALOMON, C.
6861, 6863
SAN MIGUEL, J. G.
7178
SANDERS, V.
6764*
SANDMIRE, H. F.
7143*
SANDRITTER, W.
6761*
SANNA, R.
6801
SANTAMARIA, C.
7194*
SARGENT, P.
7078*
SARKAR, N. H.
6893*
SARLES, H. E.
6956
SARRIF, A. M.
6760*
SASANO, N.
7131*
SASTRY, K. V.
6744*
SATO, E.
7131*
SATTLER, G. L.
7190
SAWICKI, E.
6712
SAXINGER, W. C.
6900*
SCARISBRICK, J. J.
6788*
SCHAFER, R.
7083*
SCHAFROTH, U.
7040*
SCHAUER, A.
7031*
SCHAUF, V.
6841
SCHEINER, C.
7164
SCHERRER, M.
7112
SCHIEFERSTEIN, G.
6676
SCHIFFER, D.
6768*
SCHINDLER, H.
7012
SCHMAUZ, R.
7127*
SCHMIDT, C. G.
7075*
SCHMIDT, H.
7088*
SCHMITZ, R.
6901*, 6933*
SCHMOECKEL, C.
6966
SCHNEIDER, H. M.
7083*
SCHNEIDERMAN, M. H.
6821*
SCHOLL, H.
7032*
SCHROTER, C.
6959
SCHUBERT, G. E.
6830
SCHULTZ, A
6897*
SCHULTZ, E. F.
6995
SCHULZ, A.
7067*
SCHWARTZ, S. A.
7179
SCHWIDDE, J. T.
7013
SEABRIGHT, M.
6824*
SEARLES, S.
6668
SEEMAYER, N.
6751*, 6880*
SEGAL, G. P.
6922
SEGERLING, M.
6952*
SEIDEL, H. J.
6844
SEIJI, M.
6794
SELIGER, H. H.
6757*
SELIKOFF, I. J.
6670, 6736*
SELKIRK, J. K.
6699, 6755*
SELLYEI, M.
6979
SELTEN-VERSTEEGEN, A. M.
6888*
SENN, A.
7112
SERGOVICH, F.
7085*
SEVERSON, R. E.
6681
SHAH, K. V.
6858, 6860
SHAMOTO, M.
7071*
SHANI, J.
6636
SHANMUGAM, G.
6849
SHAPOT, V. S.
6677, 6687
SHARMA, K.
6980
SHEFFIELD, J. B.
6892*
SHEININ, R.
6882*
SHENDE, A.
7063*
SHENK, T. E.
6854
SHIMIZU, F.
6910*
SHIMIZU, Y.
6910*
SHINKARENKO, V. S.
6967
SHIRAGA, T.
6691
SHIRAKAWA, S.
7060*
SHLOMAI, J.
6871
SHOHAM, D.
6999
SHOPSIS, C.
6882*
SHORE, B.
6894*
SHOYAB, M.
6828
SHPORER, M.
7200*
SHUMWAY, S. E.
6985
SIDEBOTTOM, E.
6663*
SIEBER, S. M.
6725*
SIGURDSON, E.
7149*
SILAGI, S.
6633
SILINI, G.
6822*
SINGH, H. B.
6737*
SINZINGER, H.
7164
SIROVER, M. A.
6674
SISSON, J. C.
7044*
SKEEL, D. A.
6973
SKURKOVICH, S. V.
6925
SLEMROVA, J.
6665
SMI, N.
7145*
SMINK, T.
6649*, 7159
SMITH, G. L.
7175
SMITH, H. S.
6852
SMITH, P. G.
6615
SMOUT, M.
7085*
SMOUT, M. S.
6970
SNOOK, M. E.
6681
SOEIRO, R.
6835

* INDICATES A PLAIN CITATION WITHOUT ACCOMPANYING ABSTRACT

SCKOLOV, N. A.
6677, 6687
SOLOMON, L.
7129*
SCMMERS, S. C.
7001
SONSTEGARD,R. A.
7096*
SOONG, L. M.
6678
SORKIN, E.
6939*
SOTO, E.
6762*
SOWA, M.
7017
SPACKMAN, D.
6915*
SPAGGIARE, S.
7158
SPATH, B.
6901*, 6933*
SPECTER, S.
6885*
SPECTOR, M.
6977
SPEERS, W. C.
6978
SPENCE, A. M.
6770*
SPENCER, I.
7007
SPICER, S. S.
6977
SPIEGELMAN, I.
6974
SPIEGELMAN, S.
6645*
SPITZER, G.
7154
SPROWLS, R. W.
6676
STACHER, A.
7061*
STANG-VOSS, C.
6826*
STAVROU, D.
6769*, 6772*, 6774*, 7145*
STEFAN, H.
7050*
STEGER, R.
7180
STEGNER, H. E.
7020*, 7023*, 7024*
STEHLIN, J. S.
7194*
STEIN, G. S.
6795
STEIN, J. L.
6795
STEINBERG, A. D.
6996
STEINIG, J.
6700
STENBACK, F.
6754*
STEPHEN, J.
7153
STEPHENS, R
6706
STEPHENSON, H. R.
6857
STEWART, B. W.
6714
STILLER, D.
7090*
STINTZ, A. R.
7088*
STOCK, A. D.
7056*
STOCKERT, E.
6843
STOLL, R. E.
6779*
STOLOFF, L.
6666
STOTT, H.
6706
STRANDBERG, J. D.
6858
STRAUB, K.
6695
STRAUSS, B.
6871
STRICKLAND, J. E.
6898*
STRICKLAND, P.
6813*, 6814*
STRICKLAND, R. G.
6930
STROBINO, B. R.
7122
STROMINGER, J. L.
6866
STUART, A.
7066*
STUART, M.
6678
SUBTIL, E.
7079*
SUCHI, T.
7071*
SUGAHARA, T.
6778*
SUGAI, S.
6946*
SUGANO, S.
7017
SUN, C. N.
6982
SUZUKI, F.
6778*
SUZUKI, N.
6817*
SVEDA, M. M.
6835
SWAHLEN, A.
6957
SWANSTROM, R. I.
6909*
SWEET, M. B.
7165
SWENBERG, J. A.
6713
SWERDLOW, M. A.
7022*
SWETLY, P.
6886*
SWIERENGA, S. H.
7161
SWOLIN, B.
6962
SYMES, E. K.
7191
SYNDERMAN, R.
6918
SZANIAWSKI, W.
7186
SZEPSENWOL, J.
6775*
TAKAHASHI, I.
7068*
TAKAMORI, Y.
6838, 6842
TAKAYAMA, S.
6710
TAKEICHI, N.
6937*
TALAL, N.
6946*
TAMM, A.
6724*
TAN, T. H.
7002
TANAKA, A.
6907*
TANDON, S. K.
6673
TANTOW, J.
6958
TARASCHI, N.
6892*
TAYLOR, B. A.
6692
TAYLOR, H. B.
6968
TCHAO, R.
7153
TCHERNIA, G.
7079*
TEMPLETON, A. C.
7132*
TERZAKIS, J. A.
7001
THIELE, J.
7037*
THOMAS, B. S.
7191
THOMAS, G.
7167
THOMAS, J. A.
6782*
THOMAS, L.
6736*
THOMPSON, E. B.
7163
THOMPSON, N. W.
7044*
THONAR, E. J.
7165
THORLEY-LAWSON, D. A.
6866
THORMANN, T.
7087*

TILTON, J.
6928
TIMMS, B. G.
6780*, 6781*
TIZEK, E.
6901*
TIZEK, F.
6933*
TODORUTIU, C.
7048*
TOM, B. H.
7195*
TOMASOVIC, S. P.
6820*
TOMATIS, L.
6601
TOMINGAS, R.
6752*, 6753*
TOTH, B.
6740*
TRANCHIDA, L.
7076*
TRAPUKDI, S.
7008, 7047*
TRAUT, H.
6643*
TRENTIN, J. J.
6905*
TROTNOW, S.
7136*
TRUCKSESS, M.
6666
TUNG, J. S.
6843
TUPPER, J. T.
7158
TURLER, H.
6861
TURNER, S.
6852
TURPIN, F.
6998
TYROLER, H. A.
7123
UCHINO, H.
6802, 7060*
UEMURA, T.
6748*
UMEYAMA, K.
7017
URBACH, G. I.
6926
URIBURU, I. J.
7041*
VAHERI, A.
6647*
VALERIO, M. G.
6913*
VALIS, J.
6858
VALMIN, K.
7081*
VAN DONGEN, C. G.
6762*
VAN NAGELL, J. R.
6975
VAN PUTTEN, L. M.
7159
VAN SANTEN, L.
6877*
VANDERLAAN, M.
6813*, 6814*
VANPUTTEN, L. M.
6649*
VARAKIS, J. N.
6903*
VASS, L.
6979
VAUGHN, C. B.
6787*
VAUGHT, J. B.
6697
VERNICK. D.
6715
VERONESI, U.
6859
VESCO, C.
6851
VILDE, F.
7015
VILDE, J. L.
7064*
VOELKER, R. E.
6738*
VOGEL, A.
6879*
VOGEL, H. H.
6809*
VOGT, P. K.
6833
VOLCHOK, H. L.
6644*
VOLPE, R.
6639
VOM BRUCK, C. G.
6672
VOYLES, B. A.
6864
VYKOUPIL, K. F.
7037*
WAGNER, E. K.
6909*
WAGNER, R.
6739*, 7092*
WAGONER, J. K.
7116, 7119, 7120
WAKUTA, Y.
7065*
WALBAUM, P. R.
7034*
WALKER, R. N.
6678
WALKER, W.
7007
WALLACH, D. F.
6812*
WALLACH, M. J.
7158
WALLCAVE, L.
6754*
WALLER, H.
6773*
WALLER, H. D.
6997
WALLER, M.
6773*
WALLINGFORD, K. M.
7148*
WALTERS, D. B.
6681
WANG, D. Y.
7191
WANG, L. H.
6876*
WANG, N. S.
7035*
WARD, R. M.
6993
WARONSKI, W.
7189
WARTERS, R. L.
6819*
WATANABE, P.
6736*
WATERS, R.
6793
WATTENBERG, L. W.
6756*
WAZETER, F. X.
6789*
WEBER, G.
7184
WEIL, R.
6861, 6863
WEILAND, L. H.
6990
WEILER, L.
6741*
WEINSTEIN, E.
6965
WEINTRAUB, B. D.
7192
WEISBURGER, E. K.
6730*
WEISBURGER, J. H.
6703, 6730*
WEISE, R.
7073*
WERNER, B.
7107
WERNER, F. J.
6869
WESTBERG, N. G.
6962
WETZSTEIN, R.
6989
WHELLY, S. M.
7166
WHITE, J. F.
6779*
WHITFIELD, J. F.
7160, 7161, 7177
WHITNEY, L. W.
7137*
WIENS, A. W.
6837
WILDNER, G. P.
6734*
WILLIAMS, G. M.
6728*
WILLIAMS, J. R.
6634
WILLIAMS, L. J.
7194*

WILLIAMS, P. D.
6683
WILLIAMS, R. C.
6930
WILLIAMS, R. E.
6955*
WILLIAMSON, H.
6977
WILLIS, D. B.
6834
WILMS, K.
6997
WILSON, J. C.
7144*
WILSON, J. W.
6949*
WILSON, M. G.
7026*
WILSON, P. D.
7095*
WILSON, R. B.
6684
WINKELMANN, R. K.
6625
WINTER, R.
7189
WINZER, K.
7020*
WIPPRECHT, K. G.
7002
WITHERINGTON, R.
6973
WITHERS, H. R.
6805*
WITSCHEL, H.
6981
WITT, K.
7113
WITWICKI, T.
6803
WITZ, I. P.
6954*
WOCKEL, W.
7099, 7100
WOHLRAB, W.
7199*
WOLF, W.
6636
WOLFE, J. N.
7104
WOLFE, L.
6868
WOLMAN, S. R.
6964
WOODARD, E.
7101
WOODS, S.
6764*
WOTTAWA, A.
6719
WRIEDT-LUBBE, I.
6769*
WRIGHT, J. E.
7162
WU, A. M.
6897*
WU, J. D.
6911*
WULFF, H. D.
7009
WURSTER, K.
7028*, 7029*
WYLLIE, A. H.
6659*
YAACKUBOWICZ, M.
6954*
YAGHMAI, I.
7036*
YAJIMA, Y.
6907*
YAMADA, S.
7093*
YAMAMOTO, D.
6776*
YAMAMOTO, S.
7017
YAMANO, T.
6729*
YAMANOUCHI, K.
6832
YANIV, A.
6874
YEN, S. S.
6786*
YIM, S. O.
7194*
YODA, K.
7181
YONKOSKY, D.
6942*, 6943*
YOSHIKAWA, Y.
6832
YOUNG, R. S.
6736*
YOURTEE, D. M.
6668
YUCE, G.
6723*
ZACHARCHUK, C. M.
6892*
ZACHARIAE, H.
6792*
ZACHARIAS, D. E.
6685
ZACHRAU, R. E.
6894*
ZAK, F. G.
7045*
ZAMBERNARD, J.
7196*
ZANOBONI, A.
6642*
ZANOBONI-MUCIACCIA, W.
6642*
ZAUMSEIL, R. P.
7199*
ZELLER, C.
7112
ZIMMERMAN, H.
7112
ZIMMERMAN, L. E.
6981
ZINMERMANN, A.
6627
ZOTTER, S.
6848
ZUELZER, W. W.
6963
ZUMWALDE, R. D.
7148*
ZURHEIN, G. M.
6903*
ZYLKA, U.
6787*

ACETAMIDE, N-(ACETYLOXY)-N-9H-FLUOREN-2-YL-
- AMINO ACIDS
  - DNA REPAIR, 6795
- HISTONES
  - DNA REPAIR, 6795
- NUCLEOPROTEINS
  - DNA REPAIR, 6795

ACETAMIDE, N-FLUOREN-2-YL-
- ACETANILIDE, 4'-HYDROXY-
  - AMIDOHYDROLASES, 6730*
  - ARYL HYDROCARBON HYDROXYLASES, 6730*
  - GLUCURONIC ACID, 6730*
- BENZO(A)PYRENE
  - HYDROXYLASES, 6749*
- BLADDER NEOPLASMS
  - EPIDEMIOLOGY, MOUSE, 6727*
  - HYPERPLASIA, 6727*
- HEPATOMA
  - ENZYMATIC ACTIVITY, REVIEW, 6631
- LIVER NEOPLASMS
  - CELL DIVISION, 6728*
  - PRECANCEROUS CONDITIONS, 6728*
  - SIDEROSIS, 6728*
- SERINE DEHYDRATASE
  - CELL TRANSFORMATION, NEOPLASTIC, REVIEW, 6631

ACETAMIDE, N-FLUOREN-2-YLDI-
- HEPATOMA
  - PRECANCEROUS CONDITIONS, 6731*
  - STRAIN DIFFERENCE, RAT, 6731*
- LIVER CIRRHOSIS
  - STRAIN DIFFERENCE, RAT, 6731*

ACETAMIDE, N,N'-9H-FLUORENE-2,7-DIYLBIS-
- BLADDER NEOPLASMS
  - DOSE-RESPONSE STUDY, MOUSE, 6676
- EYE NEOPLASMS
  - DOSE-RESPONSE STUDY, MOUSE, 6676
- HEPATOMA
  - DOSE-RESPONSE STUDY, MOUSE, 6676
- MAMMARY NEOPLASMS, EXPERIMENTAL
  - CARCINOGENIC ACTIVITY, 6679
  - CARCINOMA, 6679
- PAROTID NEOPLASMS
  - DOSE-RESPONSE STUDY, MOUSE, 6676
- SALIVARY GLAND NEOPLASMS
  - DOSE-RESPONSE STUDY, MOUSE, 6676

ACETANILIDE, 4'-HYDROXY-
- ACETAMIDE, N-FLUOREN-2-YL-
  - AMIDOHYDROLASES, 6730*
  - ARYL HYDROCARBON HYDROXYLASES, 6730*
  - GLUCURONIC ACID, 6730*
- ACETOHYDROXAMIC ACID, N-FLUOREN-2-YL-
  - AMIDOHYDROLASES, 6730*
  - ARYL HYDROCARBON HYDROXYLASES, 6730*
  - GLUCURONIC ACID, 6730*

ACETIC ACID, (ETHYLENEDINITRILO)TETRA-
- BENZO(A)PYRENE
  - HYDROXYLASES, 6749*

ACETOHYDROXAMIC ACID, N-FLUOREN-2-YL-
- ACETANILIDE, 4'-HYDROXY-
  - AMIDOHYDROLASES, 6730*
  - ARYL HYDROCARBON HYDROXYLASES, 6730*
  - GLUCURONIC ACID, 6730*
- ASCORBIC ACID
  - CARCINOGENIC METABOLITE, 6678
- FREE RADICALS
  - CARCINOGENIC METABOLITE, 6678
- HYDROPEROXIDE
  - CARCINOGENIC METABOLITE, 6678
- LINOLEIC ACID
  - CARCINOGENIC METABOLITE, 6678

ACETOPHENONE
- ULTRAVIOLET RAYS
  - DNA REPLICATION, 6815*

ACETYLAMINOFLUORENE
- SEE ACETAMIDE, N-FLUOREN-2-YL-

ACID PHOSPHATASE
- DUODENAL NEOPLASMS
  - GUANIDINE, 1-ETHYL-3-NITRO-1-NITROSO-, 7093*
- LEUKEMIA, HAIRY CELL
  - ENZYMES, 6997
  - TARTARIC ACID, 6997

ACRIDINE, 3,6-DIAMINO-
- VIRUS, FRIEND MURINE LEUKEMIA
  - ERYTHROPOIESIS, 6837

ACTINOMYCIN D
- ADENOSINE, 3'-DEOXY-
  - CELL CYCLE KINETICS, HAMSTER OVARY, 6820*
- ANEMIA, APLASTIC
  - DOSE-RESPONSE STUDY, 7078*
- ATAXIA TELANGIECTASIA
  - CHROMATIDS, 7078*
  - DOSE-RESPONSE STUDY, 7078*
- CAFFEINE
  - CELL CYCLE KINETICS, HAMSTER OVARY, 6820*
- FIBROBLASTS
  - RIBOSOMAL PROTEINS, 7166
- HEPATOMA
  - ENZYMATIC ACTIVITY, REVIEW, 6631
- LUNG NEOPLASMS
  - NEOPLASM METASTASIS, 6791*
  - SARCOMA, 6791*
- RADIATION, IONIZING
  - CELL CYCLE KINETICS, HAMSTER OVARY, 6820*

ADENINE
- BUTYRIC ACID, 2-AMINO-4-(ETHYLTHIO)-
  - CELL TRANSFORMATION, NEOPLASTIC, 6741*

ADENOCARCINOMA
- BLADDER NEOPLASMS
  - BLADDER EXSTROPHY, 7016
  - 1-BUTANOL, 4-(BUTYLNITROSAMINO)-, 7031*
  - CASE REPORT, 7016
- CHALONES
  - MITOSIS, 7157

  - COLONIC NEOPLASMS
    - CELL LINE, 7195*
    - HYDRAZINE, 1,2-DIMETHYL-, 6704
  - DUODENAL NEOPLASMS
    - GUANIDINE, 1-ETHYL-3-NITRO-1-NITROSO-, 7093*
    - HYDRAZINE, 1,2-DIMETHYL-, 6739*, 7092*
    - ULTRASTRUCTURAL STUDY, 7092*
  - ENDOMETRIAL HYPERPLASIA
    - CARBOHYDRATES, 7188
    - ENZYMES, 7188
    - GLUCOSEPHOSPHATE DEHYDROGENASE, 7188
  - ENDOMETRIUM
    - CARBOHYDRATES, 7188
    - ENZYMES, 7188
    - GLUCOSEPHOSPHATE DEHYDROGENASE, 7188
  - HYDRAZINE, 1,2-DIMETHYL-
    - ULTRASTRUCTURAL STUDY, 6739*
  - INTESTINAL NEOPLASMS
    - HYDRAZINE, 1,2-DIMETHYL-, 6739*, 7092*
    - ISOANTIGENS, 7091*
    - ULTRASTRUCTURAL STUDY, 7092*
  - KIDNEY NEOPLASMS
    - VIRUS, LEOPARD FROG CARCINOMA, 7196*
  - LUNG NEOPLASMS
    - SMOKING, 7112
  - NOSE NEOPLASMS
    - OCCUPATIONAL HAZARD, 7115
  - OVARIAN NEOPLASMS
    - CHOLESTEROL, URINARY, 7003
    - NEOPLASMS, MULTIPLE PRIMARY, 6968
  - PANCREATIC NEOPLASMS
    - CASE REPORT, 7074*
    - PROPYLAMINE, 2-HYDROXY-N-NITROSOBIS-, 6684
  - PROSTATIC NEOPLASMS
    - TREATMENT AND PROGNOSIS, 7030*
  - STOMACH NEOPLASMS
    - DIETHYLAMINE, N-NITROSO-, 6762*
    - SUCRASE, 7017
  - THYROID NEOPLASMS
    - DIAGNOSIS AND TREATMENT, REVIEW, 6639
  - TRIAZENE, 3,3-DIETHYL-1-(M-PYRIDYL)-
    - CARCINOGENIC ACTIVITY, 6705
  - TRIAZENE, 3,3-DIETHYL-1-PHENYL-
    - CARCINOGENIC ACTIVITY, 6705
  - UTERINE NEOPLASMS
    - ESTRADIOL, 6786*
    - ESTRONE, 6786*
    - NEOPLASMS, MULTIPLE PRIMARY, 6968
    - ULTRASTRUCTURAL STUDY, 7001
  - VIRUS, EPSTEIN-BARR
    - ANTIBODIES, 6905*

- ADENOFIBROMA
  - BREAST NEOPLASMS
    - CASE REPORT, 6971
    - DIABETES MELLITUS, 7136*
  - MAMMARY NEOPLASMS, EXPERIMENTAL
    - ASBESTOS, 6734*

- ADENOMA
  - HYDRAZINE, 1,1,2-TRIMETHYL-, HYDROCHLORIDE
    - CARCINOGENIC POTENTIAL, MOUSE, 6740*
  - KIDNEY NEOPLASMS
    - HYDRAZINE, 1,1,2-TRIMETHYL-, HYDROCHLORIDE, 6740*
  - LUNG NEOPLASMS
    - HYDRAZINE, 1,1,2-TRIMETHYL-, HYDROCHLORIDE, 6740*
  - PANCREATIC NEOPLASMS
    - PROPYLAMINE, 2-HYDROXY-N-NITROSOBIS-, 6684
  - PITUITARY NEOPLASMS
    - CLASSIFICATION, 7011
    - ULTRASTRUCTURAL STUDY, 7011
  - PROLACTIN
    - ULTRASTRUCTURAL STUDY, 7046*
  - THYROID NEOPLASMS
    - SEX CHROMOSOMES, 6979
    - THYROGLOBULIN, 7043*
    - ULTRASTRUCTURAL STUDY, 7043*

- ADENOMA, CHROMOPHOBE
  - PROLACTIN
    - ULTRASTRUCTURAL STUDY, 7046*

- ADENOSINE CYCLIC 3',5' MONOPHOSPHATE
  - PHOSPHODIESTERASES
    - RADIATION-PROTECTIVE AGENTS, 6806*
  - RADIATION, IONIZING
    - CELL CYCLE KINETICS, HAMSTER OVARY, 6806*
    - PHOSPHODIESTERASES, 6806*
    - RADIATION-PROTECTIVE AGENTS, 6806*

- ADENOSINE, 3'-DEOXY-
  - ACTINOMYCIN D
    - CELL CYCLE KINETICS, HAMSTER OVARY, 6820*

- ADENOSINE TRIPHOSPHATASE
  - DUODENAL NEOPLASMS
    - GUANIDINE, 1-ETHYL-3-NITRO-1-NITROSO-, 7093*

- ADRENAL CORTEX HORMONES
  - IMMUNITY, CELLULAR
    - STRESS, 6934*

- ADRENAL GLAND NEOPLASMS
  - ADRENOGENITAL SYNDROME
    - CASE REPORT, 7012
  - AMERICIUM
    - DOSE-RESPONSE STUDY, MOUSE, 6798
  - LIPOMA
    - ADRENOGENITAL SYNDROME, 7012

- ADRENOGENITAL SYNDROME
  - ADRENAL GLAND NEOPLASMS
    - CASE REPORT, 7012
    - LIPOMA, 7012

- AFLATOXIN
  - INTESTINAL NEOPLASMS
    - CARCINOMA, 6723*
  - LIVER NEOPLASMS
    - CARCINOGENIC ACTIVITY, 6723*

- AFLATOXIN B1
  - GASTROINTESTINAL NEOPLASMS
    - CASE REPORT, 6668
  - HEPATOMA
    - FETAL GLOBULINS, 6725*
    - PRECANCEROUS CONDITIONS, 6725*
  - LIVER NEOPLASMS
    - CASE REPORT, 6668
    - FOOD CONTAMINATION, 6668
    - HEMANGIOENDOTHELIOMA, 6725*
    - METABOLISM, 6668
  - NORGESTREL
    - FATTY LIVER, 6669
    - GLUTATHIONE, 6669
    - HEPATOTOXICITY, RAT, 6669
    - OXIDOREDUTASES, N-DEMETHYLATING, 6669

- AGING
  - ANTIGENS, HETEROGENETIC
    - ANTIBODY FORMATION, 6938*
  - BONE MARROW CELLS
    - TRANSPLANTATION, HOMOLOGOUS, 6938*
  - DNA REPAIR
    - CELL TRANSFORMATION, NEOPLASTIC, REVIEW, 6634
  - FIBROBLASTS
    - MITOSIS, 6855
  - MITOCHONDRIA, LIVER
    - CYTOCHROME OXIDASE, 7095*
    - MALATE DEHYDROGENASE, 7095*
    - ULTRASTRUCTURAL STUDY, 7095*
  - PLANT AGGLUTININS
    - IMMUNE RESPONSE, 6938*
  - RADIATION, IONIZING
    - IMMUNE RESPONSE, 6938*
  - THYMUS GLAND
    - TRANSPLANTATION, HOMOLOGOUS, 6938*

- AIR POLLUTANTS
  - BENZO(A)PYRENE
    - CARCINOGENIC POTENTIAL, 6753*
  - CARBON TETRACHLORIDE
    - CHROMATOGRAPHIC ANALYSIS, 6737*
  - CARCINOMA, BRONCHOGENIC
    - EPIDEMIOLOGY, MONTANA, 7144*
  - CHLOROFORM
    - CHROMATOGRAPHIC ANALYSIS, 6737*
  - DIMETHYLAMINE, N-NITROSO-
    - ENVIRONMENTAL HAZARD, 6712
  - ETHANE, 1,1,1-TRICHLORO-
    - CHROMATOGRAPHIC ANALYSIS, 6737*
  - ETHYLENE, TETRACHLORO-
    - CHROMATOGRAPHIC ANALYSIS, 6737*
  - ETHYLENE, TRICHLORO-
    - CHROMATOGRAPHIC ANALYSIS, 6737*
  - ETHYLENE, 1,1,2-TRICHLORO-1,2,2-TRIFLUORO-
    - CHROMATOGRAPHIC ANALYSIS, 6737*
  - GASTROINTESTINAL NEOPLASMS
    - EPIDEMIOLOGY, 7147*
  - GYNECOLOGIC NEOPLASMS
    - EPIDEMIOLOGY, 7147*
  - METHANE, DICHLORODIFLUORO-
    - CHROMATOGRAPHIC ANALYSIS, 6737*
  - METHANE, IODO-
    - CHROMATOGRAPHIC ANALYSIS, 6737*
  - METHANE, TRICHLOROFLUORO-
    - CHROMATOGRAPHIC ANALYSIS, 6737*
  - RESPIRATORY TRACT NEOPLASMS
    - EPIDEMIOLOGY, 7147*

- ALANINE, PHENYL-
  - BENZENAMINE, N,N-DIMETHYL-4-((3-METHYLPHENYL)AZO)-
    - RNA, TRANSFER, 6732*
  - CADMIUM
    - LIVER, RAT, 6779*

- ALKALINE PHOSPHATASE
  - BENZ(A)ANTHRACENE, 7,12-DIMETHYL-
    - CARCINOMA, EPIDERMOID, 6689
  - CARCINOMA, EHRLICH TUMOR
    - HISTONES, 7167
  - DUODENAL NEOPLASMS
    - GUANIDINE, 1-ETHYL-3-NITRO-1-NITROSO-, 7093*

- ALKYLATING AGENTS
  - DNA
    - ALKALINE ELUTION ASSAY, 6713

- ALLOANTIGENS
  - B-LYMPHOCYTES
    - COMPLEMENT, 6931
    - IMMUNOGLOBULINS, FC, 6931

- ALPHA PARTICLES
  - RADIOISOTOPES
    - DOSE-RESPONSE STUDY, 6800

- ALPHA-AMANITINE
  - HEPATOMA
    - DIETHYLAMINE, N-NITROSO-, 6766*
  - VIRUS, HERPES SIMPLEX 1
    - RNA REPLICATION, 6873

- AMARANTH
  - CHOLEST-5-EN-3BETA-AMINE
    - DOSE-RESPONSE STUDY, 6742*
    - TOXIC EFFECTS, RAT, 6742*

- AMERICIUM
  - ADRENAL GLAND NEOPLASMS
    - DOSE-RESPONSE STUDY, MOUSE, 6798
  - BONE AND BONES
    - CASE REPORT, RETENTION, 6797
  - CARCINOMA, BRONCHIOLAR
    - DOSE-RESPONSE STUDY, MOUSE, 6798
  - HEPATOMA
    - DOSE-RESPONSE STUDY, MOUSE, 6798
  - KIDNEY NEOPLASMS
    - CARCINOMA, 6798
    - DOSE-RESPONSE STUDY, MOUSE, 6798
  - LIVER
    - CASE REPORT, RETENTION, 6797
  - LUNG NEOPLASMS
    - CARCINOMA, BRONCHIOLAR, 6798
    - DOSE-RESPONSE STUDY, MOUSE, 6798
  - LYMPHOSARCOMA
    - DOSE-RESPONSE STUDY, MOUSE, 6798
  - SARCOMA, OSTEOGENIC
    - DOSE-RESPONSE STUDY, MOUSE, 6798
  - THORAX
    - CASE REPORT, RETENTION, 6797

- AMIDOHYDROLASES
  - ACETAMIDE, N-FLUOREN-2-YL-
    - ACETANILIDE, 4'-HYDROXY-, 6730*

- ACETOHYDROXAMIC ACID, N-FLUOREN-2-YL-
  - ACETANILIDE, 4'-HYDROXY-, 6730*

- AMINO ACIDS
  - ACETAMIDE, N-(ACETYLOXY)-N-9H-FLUOREN-2-YL-
    - DNA REPAIR, 6795
  - CARRIER PROTEINS
    - LIVER, MOUSE, 6760*
  - KIDNEY NEOPLASMS
    - VIRUS, LEOPARD FROG CARCINOMA, 7196*
  - RNA, TRANSFER
    - CELLS, CULTURED, 7170
  - RNA, TRANSFER, METHYLTRANSFERASES
    - CELLS, CULTURED, 7170
  - ULTRAVIOLET RAYS
    - DNA REPAIR, 6795

- AMMONIUM
  - VIRUS, FRIEND MURINE LEUKEMIA
    - PURINES, 6836

- AMOSITE
  - SEE ASBESTOS

- ANDROGENS
  - HEPATOMA
    - ANEMIA, APLASTIC, 7007
    - CASE REPORT, 7007

- ANEMIA
  - VIRUS, AVIAN ERYTHROBLASTIC LEUKOSIS
    - VIRUS, HELPER, 6830

- ANEMIA, APLASTIC
  - ACTINOMYCIN D
    - DOSE-RESPONSE STUDY, 7078*
  - CELL DIFFERENTIATION
    - REVIEW, 6623
  - CHROMOSOME ABNORMALITIES
    - REVIEW, 6623
  - ERYTHROCYTES
    - MICROTUBULES, 6961
    - MITOCHONDRIA, 6961
    - ULTRASTRUCTURAL STUDY, 6961
  - ERYTHROPOIESIS
    - REVIEW, 6623
  - HEPATOMA
    - ANDROGENS, 7007
  - LEUKEMIA, MYELOBLASTIC
    - DIAGNOSIS AND PROGNOSIS, 7069*
  - NEUTROPHILS
    - CYTOCHEMICAL STUDY, 7064*
    - PEROXIDASES, 7064*
    - ULTRASTRUCTURAL STUDY, 7064*
  - PEROXIDASES
    - BACTERIA, 7064*
  - THORIUM DIOXIDE
    - CASE REPORT, 6826*
  - THYMOMA
    - CASE REPORT, 6958

- ANEMIA, FANCONI'S
  - SEE ANEMIA, APLASTIC

- ANEMIA, HEMOLYTIC
  - FETAL HEMOGLOBIN
    - SERUM LEVELS, 7164

- ANEMIA, PERNICIOUS
  - FETAL HEMOGLOBIN
    - SERUM LEVELS, 7164
  - STOMACH NEOPLASMS
    - CASE REPORT, 6957
    - IGA, 6957
    - IGM, 6957

- ANEMIA, SICKLE CELL
  - BURKITT'S LYMPHOMA
    - EPIDEMIOLOGY, GHANA, 7102

- ANENCEPHALUS
  - ETHYLENE, CHLORO- POLYMER
    - EPIDEMIOLOGY, 6735*

- ANGIOBLASTOMA
  - SEE ANGIOSARCOMA

- ANGIOMATOSIS
  - BRAIN NEOPLASMS
    - ANGIOSARCOMA, 7014
    - CASE REPORT, 7014
    - EYE NEOPLASMS, 7014
  - EYE NEOPLASMS
    - CASE REPORT, 7014, 7054*
    - ULTRASTRUCTURAL STUDY, 7054*

- ANGIOSARCOMA
  - BRAIN NEOPLASMS
    - ANGIOMATOSIS, 7014
  - HYDRAZINE, 1,1,2-TRIMETHYL-, HYDROCHLORIDE
    - CARCINOGENIC POTENTIAL, MOUSE, 6740*
  - LIVER NEOPLASMS
    - ETHYLENE, CHLORO-, 6736*
  - NEOPLASMS, VASCULAR TISSUE
    - HYDRAZINE, 1,1,2-TRIMETHYL-, HYDROCHLORIDE, 6740*

- ANILINE
  - ANTIPYRINE, 4-AMINO-
    - WATER POLLUTANTS, 6688
  - BENZENAMINE, N,N-DIMETHYL-4-((3-METHYLPHENYL)AZO)-
    - OXIDOREDUCTASES, 6729*
  - MICROSOMES, LIVER
    - METABOLISM, 6750*

- ANILINE, 5-CHLORO-2-METHYL-
  - ANTIPYRINE, 4-AMINO-
    - WATER POLLUTANTS, 6688

- ANILINE, M-CHLORO-
  - ANTIPYRINE, 4-AMINO-
    - WATER POLLUTANTS, 6688

- ANILINE, N,N-DIMETHYL-P-PHENYLAZO-
  - HEPATOMA
    - RNA POLYMERASE, 6675
  - LIVER NEOPLASMS
    - CARCINOGENIC ACTIVITY, 6723*

- ANILINE, O-CHLORO-
  - ANTIPYRINE, 4-AMINO-
    - WATER POLLUTANTS, 6688

- ANILINE, P-CHLORO-
  - BENZENAMINE, N,N-DIMETHYL-4-((3-METHYLPHENYL)AZO)-
    - OXIDOREDUCTASES, 6729*
  - CYTOCHROME P-450
    - MICROSOMES, LIVER, 6690
    - THIOPYROPHOSPHORIC ACID, TETRAETHYL ESTER, 6690

- ANILINE, 4,4'-SULFONYLDI-
  - CYTOCHROME P-450
    - MICROSOMES, LIVER, 6690
    - THIOPYROPHOSPHORIC ACID, TETRAETHYL ESTER, 6690

- ANILINE, 2,4,6-TRIMETHYL-
  - PITUITARY NEOPLASMS
    - CORTICOTROPIN, 6733*
    - HORMONES, 6733*
    - PROLACTIN, 6733*
    - SOMATOTROPIN, 6733*
    - ULTRASTRUCTURAL STUDY, 6733*

- ANISOLE, P-NITRO-
  - BENZENAMINE, N,N-DIMETHYL-4-((3-METHYLPHENYL)AZO)-
    - OXIDOREDUCTASES, 6729*

- ANTHOPHYLLITE
  - SEE ASBESTOS

- ANTHRACENE
  - LIVER NEOPLASMS
    - CARCINOGENIC ACTIVITY, 6723*

- ANTHRANILIC ACID, 4-CHLORO-N-FURFURYL-5-SULFAMOYL-
  - POTASSIUM
    - CELL TRANSFORMATION, NEOPLASTIC, 7158

- ANTI-INFLAMMATORY AGENTS
  - DNA REPAIR
    - REVIEW, 6719
  - DNA REPLICATION
    - REVIEW, 6719

- ANTIBODIES
  - ADENOCARCINOMA
    - VIRUS, EPSTEIN-BARR, 6905*
  - BURKITT'S LYMPHOMA
    - VIRUS, EPSTEIN-BARR, 6905*
  - HODGKIN'S DISEASE
    - VIRUS, EPSTEIN-BARR, 6905*
  - INFECTIOUS MONONUCLEOSIS
    - VIRUS, EPSTEIN-BARR, 6905*
  - VIRUS, EPSTEIN-BARR
    - ANTIGENS, VIRAL, 6905*
  - VIRUS, POLYOMA, BK
    - ANTIGENS, VIRAL, 6859
    - VIRAL PROTEINS, 6859

- ANTIBODIES, NEOPLASM
  - VIRUS, MURINE SARCOMA
    - ANTIBODY SPECIFICITY, 6922

- ANTIBODIES, VIRAL
  - LYMPHOMA
    - VIRUS, CYTOMEGALO, 6867
    - VIRUS, EPSTEIN-BARR, 6867
    - VIRUS, HERPES SIMPLEX 1, 6867
    - VIRUS, VARICELLA ZOSTER, 6867
  - SARCOMA, KAPOSI'S
    - VIRUS, EPSTEIN-BARR, 6965
  - VIRUS, HERPES SAIMIRI
    - OWL MONKEY, 6913*
  - VIRUS, MURINE MAMMARY TUMOR
    - DOSE-RESPONSE STUDY, 6847
    - IMMUNE RESPONSE, 6847
    - STRAIN DIFFERENCES, 6847

- ANTIBODY DISSOCIATION
  - FIBROSARCOMA
    - HISTOCOMPATIBILITY ANTIGENS, 6924
    - NEOPLASM TRANSPLANTATION, 6924

- ANTIBODY FORMATION
  - ANTIGENS, HETEROGENETIC
    - AGING, 6938*
  - HISTOCOMPATIBILITY ANTIGENS
    - IGM, 6943*
  - IGM
    - ALLOGENEIC SUPPRESSIVE FACTOR, 6943*
  - ISOANTIGENS
    - IGM, 6943*
  - B-LYMPHOCYTES
    - ISOANTIGENS, 6942*
  - T-LYMPHOCYTES
    - GRAFT VS HOST REACTION, 6942*
    - ISOANTIGENS, 6942*
  - LYMPHOMA
    - VIRUS, HERPES SAIMIRI, 6914*
  - VIRUS, LACTATE DEHYDROGENASE
    - ANTIGENS, HETEROGENETIC, 6915*
    - ASPARAGINASE, 6915*
    - B-LYMPHOCYTES, 6915*
    - VIRUS REPLICATION, 6915*

- ANTIBODY SPECIFICITY
  - VIRUS, GIBBON LYMPHOMA
    - ANTIGENS, VIRAL, 6857
  - VIRUS, MURINE MAMMARY TUMOR
    - VIRUS, MURINE LEUKEMIA, 6847
  - VIRUS, MURINE SARCOMA
    - ANTIBODIES, NEOPLASM, 6922
    - IMMUNE SERUMS, 6922
  - VIRUS, WOOLLY MONKEY
    - ANTIGENS, VIRAL, 6857

- ANTICOAGULANTS
  - SARCOMA, OSTEOGENIC
    - NEOPLASM METASTASIS, REVIEW, 6649*

- ANTIGEN-ANTIBODY COMPLEX
  - CARCINOMA, BRONCHOGENIC
    - IGG, 6921
  - FIBROSARCOMA
    - HISTOCOMPATIBILITY ANTIGENS, 6924
  - HYPERTHYROIDISM
    - IGG, 6921
  - MAMMARY NEOPLASMS, EXPERIMENTAL
    - IMMUNOGLOBULINS, SURFACE, 6954*
    - OVALBUMIN, 6954*
    - SERUM ALBUMIN, BOVINE, 6954*
  - THYROIDITIS
    - IGG, 6921
  - VIRUS, MURINE MAMMARY TUMOR
    - AGE FACTORS, 6848

- KIDNEY, 6848

ANTIGEN-ANTIBODY REACTIONS
- CELL TRANSFORMATION, NEOPLASTIC
  - IMMUNE RESPONSE, REVIEW, 6621
- B-LYMPHOCYTES
  - HEMOCYANIN, 6948*
  - PHENOL, 2,4-DINITRO-, 6948*
- MELANOMA
  - IMMUNITY, CELLULAR, REVIEW, 6648*
- VIRUS, EPSTEIN-BARR
  - MARMOSETS, 6868
- VIRUS, SV40
  - ANTIGENS, NEOPLASM, 6853

ANTIGENIC DETERMINANTS
- BREAST NEOPLASMS
  - VIRUS, MURINE MAMMARY TUMOR, 6894*
- ISOANTIGENS
  - S-49 CELLS, 6945*
- LYMPHOSARCOMA
  - HODGKIN'S DISEASE, 6927
  - SARCOMA, RETICULUM CELL, 6927
- VIRUS, GIBBON LYMPHOMA
  - ANTIGENS, VIRAL, 6857
- VIRUS, MOLONEY MURINE SARCOMA
  - VIRUS, RAUSCHER MURINE LEUKEMIA, 6850
- VIRUS, MURINE SARCOMA
  - IMMUNE SERUMS, 6922
- VIRUS, RAUSCHER MURINE LEUKEMIA
  - PEPTIDES, 6888*
- VIRUS, STUMPTAILED MACAQUE
  - VIRUS, POLYOMA, BK, 6860
  - VIRUS, SV40, 6860
- VIRUS, SV40
  - ANTIGENS, NEOPLASM, 6853
- VIRUS, WOOLLY MONKEY
  - ANTIGENS, VIRAL, 6857

ANTIGENS
- AUTOIMMUNE DISEASES
  - MACROGLOBULINEMIA, 6946*
- HODGKIN'S DISEASE
  - HYPERSENSITIVITY, DELAYED, REVIEW, 6652*
- IMMUNOSUPPRESSIVE AGENTS
  - HYPERSENSITIVITY, DELAYED, REVIEW, 6652*
- LEPROSY
  - HYPERSENSITIVITY, DELAYED, REVIEW, 6652*
- LEUKEMIA, LYMPHOCYTIC
  - RADIATION, IONIZING, 6929
  - THYMUS GLAND, 6929
  - VIRUS, RADIATION LEUKEMIA, 6929
- SARCOIDOSIS
  - HYPERSENSITIVITY, DELAYED, REVIEW, 6652*
- VIRUS, MURINE LEUKEMIA
  - IMMUNIZATION, 6843
- VIRUS, ROUS SARCOMA
  - CELL TRANSFORMATION, NEOPLASTIC, 6647*
- VIRUS, SV40
  - CELL TRANSFORMATION, NEOPLASTIC, 6647*

ANTIGENS, HETEROGENETIC
- AGING
  - ANTIBODY FORMATION, 6938*
- VIRUS, LACTATE DEHYDROGENASE
  - ANTIBODY FORMATION, 6915*

ANTIGENS, NEOPLASM
- ASTROCYTOMA
  - CELL MEMBRANE, 7141*
- LEUKEMIA
  - IMMUNE RESPONSE, REVIEW, 6627
- LEUKEMIA L1210
  - INTERFERON, 6925
- LYMPHOMA
  - IMMUNITY, PASSIVE, 6919
  - T-LYMPHOCYTES, 6928
- LYMPHOSARCOMA
  - LYMPHOCYTES, 6927
- MAMMARY NEOPLASMS, EXPERIMENTAL
  - ANTIBODY BINDING, 6954*
- MELANOMA
  - IMMUNITY, CELLULAR, REVIEW, 6648*, 6935*
- NEOPLASM METASTASIS
  - REVIEW, 6658*
- NEUROBLASTOMA
  - CELL MEMBRANE, 7141*
- OVARIAN NEOPLASMS
  - CARCINOMA, EPIDERMOID, 6926
  - CYSTADENOCARCINOMA, 6926
  - CYSTADENOMA, MUCINOUS, 6926
  - ISOLATION AND CHARACTERIZATION, 6926
- RHABDOMYOSARCOMA
  - CELL MEMBRANE, 7141*
- SARCOMA
  - VIRUS, SV40, 6853
- SARCOMA, OSTEOGENIC
  - CELL MEMBRANE, 7141*
- THYROID NEOPLASMS
  - IMMUNITY, CELLULAR, 6920
- VIRUS, FRIEND MURINE LEUKEMIA
  - SPLEEN, 6885*
- VIRUS, MOLONEY MURINE SARCOMA
  - IMMUNITY, CELLULAR, 6850
- VIRUS, SV40
  - ANTIGEN-ANTIBODY REACTIONS, 6853
  - ANTIGENIC DETERMINANTS, 6853
  - ISOLATION AND CHARACTERIZATION, 6853

ANTIGENS, VIRAL
- INFECTIOUS MONONUCLEOSIS
  - HODGKIN'S DISEASE, 7084*
- LEUKEMIA
  - ISOLATION AND CHARACTERIZATION, 6845
  - VIRUS, RAUSCHER MURINE LEUKEMIA, 6845
- LEUKEMIA, MYELOBLASTIC
  - VIRUS, WOOLLY MONKEY, 6857
- LEUKEMIA, MYELOCYTIC
  - VIRUS, WOOLLY MONKEY, 6857
- LYMPHOMA
  - VIRUS, EPSTEIN-BARR, 6867
- VIRUS, EPSTEIN-BARR
  - ANTIBODIES, 6905*
  - PHOSPHONIC ACIDS, 6866
- VIRUS, GIBBON LYMPHOMA
  - ANTIBODY SPECIFICITY, 6857

- ANTIGENIC DETERMINANTS, 6857
- VIRUS, PAPOVA
  - CELL TRANSFORMATION, NEOPLASTIC, 6858
- VIRUS, PAPOVA, BK
  - CELL TRANSFORMATION, NEOPLASTIC, 6858
- VIRUS, POLYOMA, BK
  - ANTIBODIES, 6859
- VIRUS, RADIATION LEUKEMIA
  - RADIATION, IONIZING, 6840
- VIRUS, RAUSCHER MURINE LEUKEMIA
  - ERYTHROCYTES, 6845
- VIRUS, SV40
  - CELL TRANSFORMATION, NEOPLASTIC, 6852, 6858, 6878*
  - ISOLATION AND CHARACTERIZATION, 6878*
- VIRUS, WOOLLY MONKEY
  - ANTIBODY SPECIFICITY, 6857
  - ANTIGENIC DETERMINANTS, 6857

ANTILYMPHOCYTE SERUM
- VIRUS, MOLONEY MURINE SARCOMA
  - T-LYMPHOCYTES, 6850

ANTIPYRINE, 4-AMINO-
- ANILINE
  - WATER POLLUTANTS, 6688
- ANILINE, 5-CHLORO-2-METHYL-
  - WATER POLLUTANTS, 6688
- ANILINE, M-CHLORO-
  - WATER POLLUTANTS, 6688
- ANILINE, O-CHLORO-
  - WATER POLLUTANTS, 6688
- M-TOLUIDINE
  - WATER POLLUTANTS, 6688
- O-TOLUIDINE
  - WATER POLLUTANTS, 6688
- P-TOLUIDINE
  - WATER POLLUTANTS, 6688
- 2,4-XYLIDINE
  - WATER POLLUTANTS, 6688
- 2,5-XYLIDINE
  - WATER POLLUTANTS, 6688
- 2,6-XYLIDINE
  - WATER POLLUTANTS, 6688

ANTISERUM
- SEE IMMUNE SERUMS

ARGININE
- VIRUS, HERPES SIMPLEX 1
  - RNA REPLICATION, 6873

ARSENIC
- CARCINOMA, BRONCHOGENIC
  - AIR POLLUTION, 7144*

ARTHRITIS, RHEUMATOID
- LEUKEMIA, MYELOBLASTIC
  - BUTYRIC ACID, 4-(P-(BIS(2-CHLOROETHYL)AMINO)PHENYL)-, 7079*
  - CYCLOPHOSPHAMIDE, 7079*

ARYL HYDROCARBON HYDROXYLASES
- ACETAMIDE, N-FLUOREN-2-YL-
  - ACETANILIDE, 4'-HYDROXY-, 6730*
- ACETOHYDROXAMIC ACID, N-FLUOREN-2-YL-
  - ACETANILIDE, 4'-HYDROXY-, 6730*
- BENZO(A)PYRENE
  - MICROSOMES, LIVER, 6757*
- CHOLANTHRENE, 3-METHYL-
  - LIVER, RAT, 6748*
  - MICROSOMES, LIVER, 6757*
- CYANIDE
  - LIVER, RAT, 6748*
- NAD
  - LIVER, RAT, 6748*
- SMOKING
  - LUNG, RODENT, 6693

ASBESTOS
- FIBERS
  - CARCINOGENIC EFFECT, 6827*
- GASTROINTESTINAL NEOPLASMS
  - EPIDEMIOLOGY, 6670, 7121, 7149*
  - WATER POLLUTANTS, 7149*
- HEPATOMA
  - CARCINOGENIC ACTIVITY, 6734*
- KIDNEY NEOPLASMS
  - CARCINOMA, 6734*
- LEIOMYOSARCOMA
  - CASE REPORT, 7035*
  - ULTRASTRUCTURAL STUDY, 7035*
- LIVER NEOPLASMS
  - CARCINOMA, 6734*
- LUNG NEOPLASMS
  - CARCINOMA, 6734*
  - EPIDEMIOLOGY, 6670, 7121
  - LEIOMYOSARCOMA, 7035*
- MAMMARY NEOPLASMS, EXPERIMENTAL
  - ADENOFIBROMA, 6734*
- MESOTHELIOMA
  - ENVIRONMENTAL HAZARD, 7139*
  - EPIDEMIOLOGY, 7121
  - EPIDEMIOLOGY, FINLAND, 7139*
  - OCCUPATIONAL HAZARD, 7139*
- NEOPLASMS, MUSCLE TISSUE
  - LEIOMYOSARCOMA, 7035*
- OCCUPATIONAL HAZARD
  - PARTICLE SIZE, ULTRASTRUCTURAL STUDY, 7119, 7148*
  - THRESHOLD LIMIT VALUES, 7121
- PARTICLE SIZE
  - CARCINOGENIC POTENTIAL, 7148*
- RESPIRATORY TRACT NEOPLASMS
  - OCCUPATIONAL HAZARD, 7119
  - PARTICLE SIZE, 7148*
- STOMACH NEOPLASMS
  - ULTRASTRUCTURAL STUDY, 7019

ASBESTOSIS
- OCCUPATIONAL HAZARD
  - EPIDEMIOLOGY, 7121

ASCITIC FLUID
- SARCOMA
  - MONOAMINE OXIDASE, 7189

ASCORBIC ACID
- ACETOHYDROXAMIC ACID, N-FLUOREN-2-YL-
  - CARCINOGENIC METABOLITE, 6678
- QUINOLINE, 4-NITRO-, 1-OXIDE
  - OXIDATION, 6777*
  - PEROXIDE FORMATION, 6777*

- ASPARAGINASE
  - VIRUS, LACTATE DEHYDROGENASE
    - ANTIBODY FORMATICN, 6915*

- ASTROCYTOMA
  - ANTIGENS, NEOPLASM
    - CELL MEMBRANE, 7141*
  - BRAIN NEOPLASMS
    - CASE REPORT, 7013, 7051*
    - GENETICS, 7013
    - GLIOBLASTOMA MULTIFORME, 7013
  - HISTOCOMPATIBILITY ANTIGENS
    - CELL MEMBRANE, 7141*
  - NERVOUS SYSTEM NEOPLASMS
    - INCIDENCE RATES, MOUSE, 7145*
  - TRIAZENE, 3,3-DIETHYL-1-(M-PYRIDYL)-
    - CARCINOGENIC ACTIVITY, 6705
  - TRIAZENE, 3,3-DIETHYL-1-PHENYL-
    - CARCINOGENIC ACTIVITY, 6705

- ATAXIA TELANGIECTASIA
  - ACTINCMYCIN D
    - DOSE-RESPONSE STUDY, 7078*
  - CELL TRANSFORMATION, NEOPLASTIC
    - ANIMAL MODEL, MOUSE, 7085*
  - CHROMATIDS
    - ACTINOMYCIN D, 7078*
  - CHROMOSOME ABNORMALITIES
    - ANIMAL MODEL, MOUSE, 7085*
  - DISGERMINOMA
    - CASE REPORT, 7026*
  - OVARIAN NEOPLASMS
    - CASE REPORT, 7026*

- AUTOANTIBODIES
  - MELANOMA
    - IMMUNITY, CELLULAR, REVIEW, 6648*

- AUTOIMMUNE DISEASES
  - MACROGLOBULINEMIA
    - ANTIGENS, 6946*
    - DNA REPLICATION, 6946*

- 1H-AZEPINE, HEXAHYDRO-1-NITROSO-
  - LIVER
    - TISSUE DISTRIBUTION, RAT, 6763*
  - URINE
    - CARCINOGENIC METABOLITES, RAT,6763*

- BACTERIA
  - ANEMIA, APLASTIC
    - PEROXIDASES, 7064*
  - COLONIC NEOPLASMS
    - DIETARY FIBER, REVIEW, 6607
    - HYDRAZINE, 1,2-DIMETHYL-, 6703
    - METHANE, AZOXY-, 6703
  - GASTRCINTESTINAL SYSTEM
    - DIETARY FIBER, REVIEW, 6607

- BACTEROIDES DISTASONIS
  - INTESTINAL NEOPLASMS
    - STEROIDS, 6665

- BACTEROIDES FRAGILIS
  - INTESTINAL NEOPLASMS
    - STEROIDS, 6665

- BACTERCIDES THETAIOTAOMICRON
  - INTESTINAL NEOPLASMS
    - STEROIDS, 6665

- BACTEROIDES VULGATUS
  - INTESTINAL NEOPLASMS
    - STEROIDS, 6665

- BARBITURIC ACID,5-(1-CYCLOHEXEN-1-YL)-1,5-DIMETHYL-, SODIUM SALT
  - TILORONE
    - METABOLISM, 6694
  - MICROSOMES, LIVER
    - METABOLISM, 6750*

- BARBITURIC ACID, 5,5-DIETHYL-
  - WATER POLLUTANTS
    - ISOLATION AND CHARACTERIZATION, 7150*

- BARBITURIC ACID, 5-ETHYL-5-PHENYL-
  - DIETHYLAMINE, N-NITROSO-
    - METABOLISM, LIVER, 6707

- BENZ(A)ANTHRACENE
  - LUNG
    - RETENTION, MOUSE, HAMSTER, 6752*
  - SKIN
    - RETENTION, MOUSE, HAMSTER, 6752*

- BENZ(A)ANTHRACENE, 7-CHLOROMETHYL-
  - STRUCTURE-ACTIVITY RELATIONSHIP
    - X-RAY CRYSTALLOGRAPHY, 6685

- BENZ(A)ANTHRACENE, 7-CHLOROMETHYL-12-METHYL-
  - STRUCTURE-ACTIVITY RELATIONSHIP
    - X-RAY CRYSTALLOGRAPHY, 6685

- BENZ(A)ANTHRACENE, 7,12-DIMETHYL-
  - ABNORMALITIES
    - CEREBELLUM, MOUSE, 6747*
    - TERATOGENIC EFFECTS, 6747*
  - BENZO(A)PYRENE
    - DNA REPLICATION, 6751*
  - CARCINOMA
    - ULTRASTRUCTURAL STUDY, 6746*
  - CARCINOMA, EPIDERMOID
    - ALKALINE PHOSPHATASE, 6689
    - CARCINOGENIC ACTIVITY, 6689
    - 12-O-TETRADECANOYLPHORBOL-13-ACETATE, 6745*
  - CHROMOSOME ABERRATIONS
    - CELL TRANSFORMATION, NEOPLASTIC, 6650*
  - DNA REPLICATION
    - ESTRADIOL, 6682
    - INSULIN, 6682
    - PROGESTERONE, 6682
    - PROLACTIN, 6682
  - DUST
    - CARCINOGENIC POTENTIAL, 6751*
  - LYMPHOMA
    - CHROMOSOME ABNORMALITIES, 7085*
  - MAMMARY NEOPLASMS, EXPERIMENTAL
    - DNA REPLICATION, 6682
    - ESTRADIOL, 6682, 6783*
    - INSULIN, 6682
    - PROGESTERONE, 6682
    - PROLACTIN, 6682

- NEOPLASMS, EXPERIMENTAL
  - CHEMOTAXIS, 6939*
  - MONOCYTES, 6939*
- PROGESTERONE
  - BINDING, UTERINE AND BREAST CYTOSOL, 6784*
- SMOKING
  - COCARCINOGENIC ACTIVITY, 6681
- TESTOSTERONE
  - PROSTATE, RAT, 6782*
- 12-O-TETRADECANOYLPHORBOL-13-ACETATE
  - CARCINOMA, 6746*
  - COCARCINOGENIC ACTIVITY, 6745*, 6746*
- VIRUS, SV40
  - CELL TRANSFORMATION, NEOPLASTIC, 6751*

ENZENAMINE, N,N-DIMETHYL-4-((3-METHYLPHENYL)AZO)-
- ALANINE, PHENYL-
  - RNA, TRANSFER, 6732*
- ANILINE
  - OXIDOREDUCTASES, 6729*
- ANILINE, P-CHLORO-
  - OXIDOREDUCTASES, 6729*
- ANISOLE, P-NITRO-
  - OXIDOREDUCTASES, 6729*
- CHROMATIN
  - CELL TRANSFORMATION, NEOPLASTIC, 6687
  - LIVER, RAT, 6677, 6687
  - RNA POLYMERASE, 6677
- CYTOCHROME P-450
  - MICROSOMES, LIVER, 6729*
- LIVER NEOPLASMS
  - CARCINOMA, 6686
- MICROSOMES, LIVER
  - NADH, NADPH OXIDOREDUCTASES, 6729*
  - OXIDOREDUCTASES, 6729*
- NUCLEOPROTEINS
  - CELL TRANSFORMATION, NEOPLASTIC, 6687
  - LIVER, RAT, 6677, 6687
- RNA POLYMERASE
  - CELL TRANSFORMATION, NEOPLASTIC, 6687
  - LIVER, RAT, 6687
- RNA REPLICATION
  - LIVER, RAT, 6677
- RNA, TRANSFER
  - LIVER, RAT, 6732*

ENZENE, 4-ALLYL-1,2-(METHYLENEDIOXY)-
- BENZO(A)PYRENE
  - HYDROXYLASES, 6749*

ENZENESULFONIC ACID
- ISOBUTYRIC ACID, ALPHA-AMINO-
  - AMINOISOBUTYRIC ACID, 6812*
- T-LYMPHOCYTES
  - ISOBUTYRIC ACID, ALPHA-AMINO-, 6812*
- RADIATION, IONIZING
  - ISOBUTYRIC ACID, ALPHA-AMINO-, 6812*

ENZO(A)PYREN-1-OL
- BENZO(A)PYRENE
  - METABOLISM, 6699

BENZO(A)PYREN-7-OL
- BENZO(A)PYRENE
  - METABOLISM, 6699

BENZO(A)PYRENE
- ACETAMIDE, N-FLUOREN-2-YL-
  - HYDROXYLASES, 6749*
- ACETIC ACID, (ETHYLENEDINITRILO)TETRA-
  - HYDROXYLASES, 6749*
- AIR POLLUTANTS
  - CARCINOGENIC POTENTIAL, 6753*
- BENZ(A)ANTHRACENE, 7,12-DIMETHYL-
  - DNA REPLICATION, 6751*
- BENZENE, 4-ALLYL-1,2-(METHYLENEDIOXY)-
  - HYDROXYLASES, 6749*
- BENZO(A)PYREN-1-OL
  - METABOLISM, 6699
- BENZO(A)PYREN-7-OL
  - METABOLISM, 6699
- BENZO(A)PYRENE-4,5-EPOXIDE, 4,5,-DIHYDRO-
  - CARCINOGENIC METABOLITE, 6755*
- 2-BIPHENYLOL
  - HYDROXYLASES, 6749*
- CELL TRANSFORMATION, NEOPLASTIC
  - FIBROBLASTS, REVIEW, 6646*
- CERVIX NEOPLASMS
  - CARCINOMA, 6976
  - PRECANCEROUS CONDITIONS, 6976
  - ULTRASTRUCTURAL STUDY, MOUSE, 6976
- CHOLANTHRENE, 3-METHYL-
  - BINDING, CHROMATIN, 6697
  - DIOL EPOXIDES, 6695
  - HYDROXYLATION, 6757*
- CHROMATIN
  - BINDING, 6697
- CYTOCHROME P-450
  - CELLS, CULTURED, 6696
  - OXYGENASES, 6696
- DISULFIDE, BIS(DIETHYLTHIOCARBAMOYL)-
  - NUCLEIC ACIDS, BINDING, 6756*
- DNA
  - BINDING, 6697
  - BINDING, COVALENT, 6695
  - BINDING DIOLEPOXIDES, 6698
  - DIOL EPOXIDES, 6695
- DNA REPLICATION
  - FIBROBLASTS, REVIEW, 6646*
- DUST
  - CARCINOGENIC POTENTIAL, 6751*
- ESTRADIOL
  - HYDROXYLASES, 6749*
- FOOD CONTAMINATION
  - FISH, 6700
- GLUTATHIONE
  - HYDROXYLASES, 6749*
- LUNG
  - RETENTION, HAMSTER, 6754*
  - RETENTION, MOUSE, HAMSTER, 6752*
- LYMPHOCYTES
  - DNA REPLICATION, 6751*
- MACROPHAGES
  - LACTATE DEHYDROGENASE, 6751*
- MICROSOMES, LIVER
  - ARYL HYDROCARBON HYDROXYLASES, 6757*
  - METABOLISM, 6699

- OXYGENASES
  - ENZYMATIC ACTIVITY, 6696
- POLYRIBONUCLEOTIDES
  - BINDING, COVALENT, 6695
  - MICROSOMES, LIVER, 6695
- SKIN
  - RETENTION, MOUSE, HAMSTER, 6752*
- SMOKING
  - CIGARETTE CONDENSATE, 6701
  - QUANTITATION METHOD, 6701
- STOMACH NEOPLASMS
  - DISULFIDE, BIS (DIETHYLTHIOCARBAMOYL)-, 6756*
- VIRUS, SV40
  - CELL TRANSFORMATION, NEOPLASTIC, 6751*

BENZO(A)PYRENE-4,5-EPOXIDE, 4,5,-DIHYDRO-
- BENZO(A)PYRENE
  - CARCINOGENIC METABOLITE, 6755*

BENZO(A)PYRENE, 6-IODO-
- BENZO(A)PYRENE, 6-TRITIO-
  - DNA, 6702

BENZO(A)PYRENE-4,5-OXIDE
- CHOLANTHRENE, 3-METHYL-
  - EPOXIDE REDUCTION, 6691
- CYTOCHROME P-450
  - EPOXIDE REDUCTION, 6691
- MICROSOMES, LIVER
  - EPOXIDE REDUCTION, 6691

BENZO(A)PYRENE, 6-TRITIO-
- BENZO(A)PYRENE, 6-IODO-
  - DNA, 6702
- DNA
  - BINDING, 6702

BENZOIC ACID, 3,3'-DITHIOBIS-6-NITRO-
- INSULIN
  - AMINOISOBUTYRIC ACID, 6812*
- T-LYMPHOCYTES
  - AMINOISOBUTYRIC ACID, 6812*
- RADIATION, IONIZING
  - AMINOISOBUTYRIC ACID, 6812*

BENZOPYRENE HYDROXYLASE
- SEE ALSO HYDROXYLASES/ARYL HYDROCARBON HYDROXYLASE

BERYLLIUM
- VIRUS, AVIAN MYELOBLASTOSIS
  - DNA POLYMERASE, 6674
  - DNA REPLICATION, 6674

BILE ACIDS AND SALTS
- GASTROINTESTINAL SYSTEM
  - DIETARY FIBER, REVIEW, 6607

BILE DUCT NEOPLASMS
- CARCINOMA
  - BIOGENIC AMINES, 7008
  - CASE REPORT, 7008
- DIETHYLAMINE, N-NITROSO-
  - PRECANCEROUS CONDITIONS, 6707
- EPIDEMIOLOGY
  - REVIEW, 6611
- NONFUNCTIONING ARGYROPHILIC TUMOR
  - HISTOLOGICAL STUDY, 7008

BIOGENIC AMINES
- BILE DUCT NEOPLASMS
  - CARCINOMA, 7008
- MEDIASTINAL NEOPLASMS
  - NEOPLASTIC ENDOCRINE-LIKE SYNDROMES, 7047*
- THYMUS NEOPLASMS
  - NEOPLASTIC ENDOCRINE-LIKE SYNDROMES, 7047*

BIPHENYL
- CARCINOGEN, CHEMICAL
  - METABOLISM, 6749*

2-BIPHENYLOL
- BENZO(A)PYRENE
  - HYDROXYLASES, 6749*

4-BIPHENYLOL
- CARCINOGEN, CHEMICAL
  - METABOLISM, 6749*

BLADDER NEOPLASMS
- ACETAMIDE, N-FLUOREN-2-YL-
  - EPIDEMIOLOGY, MOUSE, 6727*
- ACETAMIDE, N,N'-9H-FLUORENE-2,7-DIYLBIS-
  - DOSE-RESPONSE STUDY, MOUSE, 6676
- ADENOCARCINOMA
  - BLADDER EXSTROPHY, 7016
  - 1-BUTANOL, 4-(BUTYLNITROSAMINO)-, 7031*
  - CASE REPORT, 7016
- CARCINOMA
  - BLADDER EXSTROPHY, 7016
  - CASE REPORT, 7016
- CARCINOMA, EPIDERMOID
  - CASE REPORT, 6992
- CARCINOMA, PAPILLARY
  - CHROMOSOME ABNORMALITIES, 6993
- CARCINOMA, TRANSITIONAL CELL
  - 1-BUTANOL, 4-(BUTYLNITROSAMINO)-, 7031*
- CHROMOSOME ABNORMALITIES
  - CASE REPORT, 6993
- FORMAMIDE, N-(4-(5-NITRO-2-FURYL)-2-THIAZOLYL)-
  - CARCINOGENIC ACTIVITY, RAT, 6683
  - MITOMYCIN C, 6683
- HYPERPLASIA
  - ACETAMIDE, N-FLUOREN-2-YL-, 6727*
- NEOPLASM RECURRENCE, LOCAL
  - CHROMOSOME ABNORMALITIES, 6993
- NEOPLASMS, MULTIPLE PRIMARY
  - EPIDEMIOLOGY, 7103
- OCCUPATIONAL HAZARD
  - EPIDEMIOLOGY, 7123
- PAPILLOMA
  - 1-BUTANOL, 4-(BUTYLNITROSAMINO)-, 7031*
- VIRUS, HERPES
  - VIRUS-LIKE PARTICLES, 6992
- VIRUS-LIKE PARTICLES
  - CASE REPORT, 6992

BLEOMYCIN
- CELLS, CULTURED

    CELL TRANSFORMATION, NEOPLASTIC, 6758*
  FIBRINOLYSIS
    ISOBUTYRIC ACID, ALPHA-AMINO-, 6758*
  GLYCOPROTEINS
    ISOBUTYRIC ACID, ALPHA-AMINO-, 6758*
  LUNG NEOPLASMS
    ISOBUTYRIC ACID, ALPHA-AMINO-, 6791*
    SARCOMA, 6791*

BLOOD
  PROPYLAMINE, N-NITROSO-BIS(2-ACETOXY)-
    METABOLISM, HAMSTER, 6680

BLOOD GROUPS
  LEUKEMIA
    PRECANCEROUS CONDITIONS, REVIEW, 6626

BLOOD TRANSFUSION
  LEUKEMIA
    EPIDEMIOLOGY, 7101
    HORIZONTAL TRANSMISSION, 7101
  LYMPHOMA
    EPIDEMIOLOGY, 7101
    HORIZONTAL TRANSMISSION, 7101
  MULTIPLE MYELOMA
    EPIDEMIOLOGY, 7101

BLOOD VESSELS
  DUPUYTREN'S CONTRACTURE
    ULTRASTRUCTURAL STUDY, 7090*
  MELANOMA
    GROWTH SUBSTANCES, 7155
    MATHEMATICAL MODEL, CELL MIGRATION, 7155
    NEOPLASM TRANSPLANTATION, 7155
  NEOPLASMS, CONNECTIVE TISSUE
    CELL TRANSFORMATION, NEOPLASTIC, REVIEW, 6660*
  NEOPLASMS, EXPERIMENTAL
    CELL DIFFERENTIATION, REVIEW, 6635

BONE AND BONES
  AMERICIUM
    CASE REPORT, RETENTION, 6797

BONE MARROW
  LEUKEMIA, MYELOCYTIC
    ULTRASTRUCTURAL STUDY, 7037*
  MYELOID METAPLASIA
    ULTRASTRUCTURAL STUDY, 7037*

BONE MARROW CELLS
  LEUKEMIA
    CHROMOSOME ABERRATIONS, 6802
    PRECANCEROUS CONDITIONS, 6802
  LEUKEMIA, MYELOBLASTIC
    CELL AGGREGATION, 7154, 7197*
    CELL DIFFERENTIATION, 7197*
  POLYCYTHEMIA VERA
    PHOSPHORUS, 6959
  TRANSPLANTATION, HOMOLOGOUS
    AGING, 6938*
  VIRUS, ABELSON MURINE LEUKEMIA
    CELL TRANSFORMATION, NEOPLASTIC, 6884*
  VIRUS, AVIAN ERYTHROBLASTIC LEUKOSIS
    CELL TRANSFORMATION, NEOPLASTIC, 6830
  VIRUS, RADIATION LEUKEMIA
    CELL TRANSFORMATION, NEOPLASTIC, 6839
    VIRUS REPLICATION, 6840

BONE NEOPLASMS
  BONE SCREWS
    CASE REPORT, 6803
  EPIDEMIOLOGY
    SOUTH AFRICA, 7129*
  FIBROSARCOMA
    WOUNDS AND INJURIES, 6803
  FIBROUS DYSPLASIA, POLYOSTOTIC
    CASE REPORT, 7039*
  GIANT CELL TUMORS
    CASE REPORT, 7038*
    ULTRASTRUCTURAL STUDY, 7038*
  RHABDOMYOSARCOMA
    WOUNDS AND INJURIES, 6803
  SARCOMA, OSTEOGENIC
    CASE REPORT, 7039*
    FIBROUS DYSPLASIA, POLYOSTOTIC, 7039*
    NEOPLASM METASTASIS, 7039*

BRAIN NEOPLASMS
  ANGIOMATOSIS
    CASE REPORT, 7014
  ANGIOSARCOMA
    ANGIOMATOSIS, 7014
  ASTROCYTOMA
    CASE REPORT, 7013, 7051*
    GENETICS, 7013
    GLIOBLASTOMA MULTIFORME, 7013
  CARCINOMA, EPIDERMOID
    CASE REPORT, 7065*
  CLONE CELLS
    BUTYRIC ACID, 4-AMINO-, 6767*
    CHOLINE ACETATE (ESTER), 6767*
    CREATINE KINASE, 6767*
    MEMBRANE POTENTIALS, 6767*
    MICROTUBULES, 6767*
  CRANIOPHARYNGIOMA
    EPIDEMIOLOGY, SOUTHWEST ASIA, 7130*
  EYE NEOPLASMS
    ANGIOMATOSIS, 7014
  FIBROMA
    CASE REPORT, 7051*
  GENETICS
    CASE REPORT, 7013
  GLIOBLASTOMA MULTIFORME
    CASE REPORT, 7013, 7050*
    GENETICS, 7013
    OLIGODENDROGLIOMA, 7050*
    WOUNDS AND INJURIES, 7050*
  GLIOMA
    DNA REPLICATION, 7126*
    EPIDEMIOLOGY, SOUTHWEST ASIA, 7130*
  MELANIN
    CASE REPORT, 7052*
  MENINGIOMA
    EPIDEMIOLOGY, SOUTHWEST ASIA, 7130*

  - NEURILEMMOMA
    - EPIDEMIOLOGY, SOUTHWEST ASIA, 7130*
  - OLIGODENDROGLIOMA
    - CASE REPORT, 7050*
  - PHARYNGEAL NEOPLASMS
    - CASE REPORT, 7052*
  - UREA, ETHYL NITROSO-
    - CARCINOGENIC ACTIVITY, RAT, 6771*
    - CARCINOGENIC METABOLITE, 6771*
    - CELL LINE, SKELETAL MUSCLE, 6767*
    - UREA, 1,3-BIS(2-CHLOROETHYL)-1-NITROSO-, 6768*
    - UREA, 1-(2-CHLOROETHYL)-3-CYCLOHEXYL-1-NITROSO-, 6768*
    - UREA, 1-(2-CHLOROETHYL)-3-(METHYLCYCLOHEXYL)-1-NITROSO-, 6768*
  - WOUNDS AND INJURIES
    - CASE REPORT, 7050*

- BREAST NEOPLASMS
  - ADENOFIBROMA
    - CASE REPORT, 6971
    - DIABETES MELLITUS, 7136*
  - AGE FACTORS
    - EPIDEMIOLOGY, DENMARK, 7106
  - BLOOD SUGAR
    - PRECANCEROUS CONDITIONS, 7136*
  - CARCINOMA
    - DNA, 7020*
    - MUCIN, 6972
    - PRECANCEROUS CONDITIONS, 7020*, 7022*
    - SCLEROSING ADENOSIS, 7022*
    - ULTRASTRUCTURAL STUDY, 7022*, 7153
  - CARCINOMA, EPIDERMOID
    - CASE REPORT, 6971
  - CARCINOMA IN SITU
    - MUCIN, 6972
    - PRECANCEROUS CONDITIONS, 7136*
  - CARCINOSARCOMA
    - CASE REPORT, 6971
  - CELLS, CULTURED
    - DNA, 7162
    - KARYOTYPING, 7162
    - MEIOSIS, 7162
  - CICATRIX
    - PRECANCEROUS CONDITIONS, 7021*
  - CYSTOSARCOMA PHYLLODES
    - CASE REPORT, 6971
  - DEHYDROEPIANDROSTERONE
    - SERUM LEVELS, 7191
  - DIABETES MELLITUS
    - PRECANCEROUS CONDITIONS, 7136*
  - DIET
    - EPIDEMIOLOGY, REVIEW, 6624
    - IODINE, 7140*
  - EPIDEMIOLOGY
    - GERMANY, 7127*
    - SCREENING TECHNIQUES, 7137*
    - SOUTH AFRICA, 7128*
  - EPIDEMIOLOGY, DENMARK
    - STATISTICAL ANALYSIS, 7106
  - GENETICS
    - EPIDEMIOLOGY, REVIEW, 6624
  - GRANULOMA
    - PRECANCEROUS CONDITIONS, 7136*
  - HORMONES
    - EPIDEMIOLOGY, REVIEW, 6624
  - IODINE
    - METABOLISM, 7140*
  - LIPOMA
    - PRECANCEROUS CONDITIONS, 7136*
  - B-LYMPHOCYTES
    - NEOPLASM METASTASIS, 6930
  - T-LYMPHOCYTES
    - NEOPLASM METASTASIS, 6930
  - MUCIN
    - HISTOLOGICAL STUDY, LOBULAR TUMOR, 6972
  - NEOPLASMS, MULTIPLE PRIMARY
    - CARCINOMA, SCIRRHOUS, 7004
    - EPIDEMIOLOGY, 7103
    - HISTOLOGICAL STUDY, 7004
    - HYPERPLASIA, 7004
  - PAPILLOMA
    - DIABETES MELLITUS, 7136*
  - PNEUMOTHORAX, ARTIFICIAL
    - EPIDEMIOLOGY, 7114
  - PRECANCEROUS CONDITIONS
    - AGE FACTORS, 7005
    - EPIDEMIOLOGY, 7105
    - EPIDEMIOLOGY, WEST GERMANY, 7005
    - RADIOGRAPHIC STUDY, PARENCHYMA, 7104
    - RISK FACTOR, CLASSIFICATION, 7104
  - UTERINE NEOPLASMS
    - ESTROGENS, 6790*
    - PRECANCEROUS CONDITIONS, 6790*
  - VIRAL PROTEINS
    - ISOLATION AND CHARACTERIZATION, 6894*
  - VIRUS, MURINE MAMMARY TUMOR
    - ANTIGENIC DETERMINANTS, 6894*
    - LEUKOCYTE MIGRATION INHIBITION, 6894*

- BRONCHIAL NEOPLASMS
  - CARCINOMA
    - CELL DIFFERENTIATION, 6988
    - EPIDEMIOLOGY, 7127*
    - EPIDEMIOLOGY, BERLIN, 7113
    - HISTOLOGICAL STUDY, 6988
  - NEOPLASMS, MULTIPLE PRIMARY
    - EPIDEMIOLOGY, 7103

- BURKITT'S LYMPHOMA
  - ANEMIA, SICKLE CELL
    - EPIDEMIOLOGY, GHANA, 7102
  - CENTRAL NERVOUS SYSTEM
    - EPIDEMIOLOGY, UGANDA, 7132*
  - HEMOGLOBIN C
    - EPIDEMIOLOGY, GHANA, 7102
  - MALARIA
    - EPIDEMIOLOGY, REVIEW, 6615
  - VIRAL VACCINES
    - EPIDEMIOLOGY, REVIEW, 6615
  - VIRUS, EPSTEIN-BARR
    - ANTIBODIES, 6905*
    - EPIDEMIOLOGY, REVIEW, 6615

- 1-BUTANAMINE, N-BUTYL-N-NITROSO-
  - DIMETHYLAMINE, N-NITROSO-
    - HEPATOTOXICITY, 6764*

- 1-BUTANOL, 4-(BUTYLNITROSAMINO)-
  - BLADDER NEOPLASMS

    ADENOCARCINOMA, 7031*
    CARCINOMA, TRANSITIONAL CELL, 7031*
    PAPILLOMA, 7031*

BUTYRIC ACID, 4-AMINO-
  BRAIN NEOPLASMS
    CLONE CELLS, 6767*

BUTYRIC ACID, 2-AMINO-4-(ETHYLTHIO)-
  ADENINE
    CELL TRANSFORMATION, NEOPLASTIC, 6741*
  CELL MEMBRANE
    CELL TRANSFORMATION, NEOPLASTIC, 6741*
  OXIDOREDUCTASES
    CELL MEMBRANE, 6741*
  RIBOSOMES
    CELL MEMBRANE, 6741*

BUTYRIC ACID, 4-(P-(BIS(2-CHLOROETHYL) AMINO)PHENYL)-
  LEUKEMIA, MYELOBLASTIC
    ARTHRITIS, RHEUMATOID, 7079*
    CASE REPORT, 7079*
    MULTIPLE SCLEROSIS, 7079*
    PRECANCEROUS CONDITIONS, 7079*

CACHEXIA
  CELL TRANSFORMATION, NEOPLASTIC
    METABOLISM, REVIEW, 6653*

CADMIUM
  ALANINE, PHENYL-
    LIVER, RAT, 6779*
  LIVER NEOPLASMS
    NECROSIS, 6779*
  NUCLEIC ACIDS
    LIVER, RAT, 6779*
  PROSTATIC NEOPLASMS
    EPIDEMIOLOGY, 7120
  PROTEINS
    LIVER, RAT, 6779*
  RESPIRATORY TRACT NEOPLASMS
    EPIDEMIOLOGY, 7120

CADMIUM CHLORIDE
  CELL DIFFERENTIATION
    PROSTATE, RAT, 6781*
  CELLS, CULTURED
    PROSTATE, RAT, 6781*
  PROSTATE
    ULTRASTRUCTURAL STUDY, RAT, 6780*
  TESTIS
    ULTRASTRUCTURAL STUDY, RAT, 6780*
  TESTOSTERONE
    SERUM LEVELS, 6780*

CAFFEINE
  ACTINOMYCIN D
    CELL CYCLE KINETICS, HAMSTER OVARY, 6820*

CALCIUM
  DNA REPLICATION
    CELL TRANSFORMATION, NEOPLASTIC, 7160
  FIBROSARCOMA
    DNA REPLICATION, 7160
  HEMANGIOENDOTHELIOMA
    DNA REPLICATION, 7160
  RHABDOMYOSARCOMA
    DNA REPLICATION, 7161

CANCER
  SEE NEOPLASMS (GENERAL AND UNSPECIFIED)

CARBAMIC ACID, ETHYL ESTER
  CELL AGGREGATION
    LIVER, RAT, 6717
  LIVER, RAT
    RIBOSOMAL PROTEINS, 6717
    RNA REPLICATION, 6717
  RIBOSOMAL PROTEINS
    CELL AGGREGATION, 6717
  RNA REPLICATION
    LIVER, RAT, 6717

CARBOHYDRATES
  ADENOCARCINOMA
    ENDOMETRIAL HYPERPLASIA, 7188
  CELL TRANSFORMATION, NEOPLASTIC
    METABOLISM, REVIEW, 6653*
  ENDOMETRIUM
    ADENOCARCINOMA, 7188

CARBON TETRACHLORIDE
  AIR POLLUTANTS
    CHROMATOGRAPHIC ANALYSIS, 6737*
  DIETHYLAMINE, N-NITROSO-
    METABOLISM, LIVER, 6707

CARBOXYPEPTIDASES
  KININS
    FIBROBLASTS, 7180

CARCINOEMBRYONIC ANTIGEN
  CERVIX NEOPLASMS
    CARCINOMA, EPIDERMOID, 6975
    ISOLATION AND CHARACTERIZATION, 6975
  COLONIC NEOPLASMS
    CELL LINE, 7195*
    DIAGNOSIS AND PROGNOSIS, 7082*
  LIVER NEOPLASMS
    NEOPLASM METASTASIS, 7082*

CARCINOGEN, CHEMICAL
  BIPHENYL
    METABOLISM, 6749*
  4-BIPHENYLOL
    METABOLISM, 6749*
  CELL TRANSFORMATION, NEOPLASTIC
    SCREENING TESTS, REVIEW, 6603
  CHROMOSOMES
    KARYOTYPING, 6671
  ENVIRONMENTAL HAZARD
    RISK EVALUATION PROGRAM, 6601
  HEPATOMA
    MOUSE, REVIEW, 6602
    REVIEW, 6611
  LIVER NEOPLASMS
    MOUSE, REVIEW, 6602
  MUTAGENIC ACTIVITY
    CELLS, CULTURED, HAMSTER, 6778*
  OCCUPATIONAL HAZARD

  RISK EVALUATION PROGRAM, 6601

CARCINOGEN, ENVIRONMENTAL
  DOSE-RESPONSE
    EPIDEMIOLOGY, REVIEW, 6662*
    RISK EVALUATION, REVIEW, 6662*
  NEOPLASMS
    REVIEW, 6661*
  OCCUPATIONAL HAZARD
    EPIDEMIOLOGY, REVIEW, 6656*

CARCINOID TUMOR
  MEDIASTINAL NEOPLASMS
    CASE REPORT, 7047*
    NEOPLASM METASTASIS, 7047*
  TESTICULAR NEOPLASMS
    CASE REPORT, 7028*, 7029*
    ULTRASTRUCTURAL STUDY, 7029*
  THYMUS NEOPLASMS
    CASE REPORT, 7047*
    NEOPLASM METASTASIS, 7047*

CARCINOMA
  BENZ(A)ANTHRACENE, 7,12-DIMETHYL-
    12-O-TETRADECANOYLPHORBOL-13-ACETATE, 6746*
    ULTRASTRUCTURAL STUDY, 6746*
  BILE DUCT NEOPLASMS
    BIOGENIC AMINES, 7008
    CASE REPORT, 7008
  BLADDER NEOPLASMS
    BLADDER EXSTROPHY, 7016
    CASE REPORT, 7016
  BREAST NEOPLASMS
    DNA, 7020*
    MUCIN, 6972
    PRECANCEROUS CONDITIONS, 7020*, 7022*
    SCLEROSING ADENOSIS, 7022*
    ULTRASTRUCTURAL STUDY, 7022*, 7153
  BRONCHIAL NEOPLASMS
    CELL DIFFERENTIATION, 6988
    EPIDEMIOLOGY, 7127*
    EPIDEMIOLOGY, BERLIN, 7113
    HISTOLOGICAL STUDY, 6988
  CERVIX NEOPLASMS
    BENZO(A)PYRENE, 6976
    PRECANCEROUS CONDITIONS, 7142*
    ULTRASTRUCTURAL STUDY, MOUSE, 6976
    VIRUS, HERPES SIMPLEX 2, 6622
  COLONIC NEOPLASMS
    HYDRAZINE, 1,2-DIMETHYL-, 6704
    IMMUNOSUPPRESSION, 6941*
    ISOANTIGENS, 7091*
    LYMPHOCYTES, 6941*
    NEOPLASM METASTASIS, 6941*, 7091*
  DUODENAL NEOPLASMS
    HYDRAZINE, 1,2-DIMETHYL-, 6739*
  HYDRAZINE, 1,2-DIMETHYL-
    ULTRASTRUCTURAL STUDY, 6739*
  INTESTINAL NEOPLASMS
    AFLATOXIN, 6723*
    HYDRAZINE, 1,2-DIMETHYL-, 6739*
    ISOANTIGENS, 7091*
  KIDNEY NEOPLASMS
    AMERICIUM, 6798
    ASBESTOS, 6734*
  LARYNGEAL NEOPLASMS
    LARYNGITIS, 7042*
    PRECANCEROUS CONDITIONS, 7042*
  LIVER NEOPLASMS
    ASBESTOS, 6734*
    BENZENAMINE, N,N-DIMETHYL-4-((3-METHYLPHENYL)AZO)-, 6686
  LUNG NEOPLASMS
    ASBESTOS, 6734*
    EXTREMITIES, 7041*
    NEOPLASM METASTASIS, 7041*
  MAMMARY NEOPLASMS, EXPERIMENTAL
    ACETAMIDE, N,N'-9H-FLUORENE-2,7-DIYLBIS-, 6679
    IMMUNITY, CELLULAR, 6901*, 6933*
    TRANSPLANTATION, HOMOLOGOUS, 6933*
  OVARIAN NEOPLASMS
    EPIDEMIOLOGY, 7002
  PANCREATIC NEOPLASMS
    GENETICS, 7074*
  PHARYNGEAL NEOPLASMS
    PRECANCEROUS CONDITIONS, 6989
  PRECANCEROUS CONDITIONS
    EPITHELIAL CELLS, VOCAL CORDS, 6989
  PROSTATIC NEOPLASMS
    TREATMENT AND PROGNOSIS, 7030*
  STOMACH NEOPLASMS
    PRECANCEROUS CONDITIONS, 7107
    SUCRASE, 7017
  12-O-TETRADECANOYLPHORBOL-13-ACETATE
    ULTRASTRUCTURAL STUDY, 6746*
  THYROID NEOPLASMS
    CASE REPORT, 6980
    DIAGNOSIS AND TREATMENT, REVIEW, 6639
    EXTREMITIES, 7041*
    IMMUNITY, CELLULAR, 6920
    NEOPLASM METASTASIS, 7041*
    THYROGLOBULIN, 7043*
    ULTRASTRUCTURAL STUDY, 6980, 7043*
  UROGENITAL NEOPLASMS
    EPIDEMIOLOGY, 7032*
    URINARY TRACT INFECTIONS, 7032*
    UROLOGIC DISEASES, 7032*
    VIRUS, GENITAL WART, 6617
    VIRUS, HERPES SIMPLEX 2, 6617
  UTERINE NEOPLASMS
    AGE FACTORS, 7142*
    PRECANCEROUS CONDITIONS, 7142*

CARCINOMA, BRONCHIOLAR
  AMERICIUM
    DOSE-RESPONSE STUDY, MOUSE, 6798
  LUNG NEOPLASMS
    AMERICIUM, 6798

CARCINOMA, BRONCHOGENIC
  AIR POLLUTANTS
    EPIDEMIOLOGY, MONTANA, 7144*
  ARSENIC
    AIR POLLUTION, 7144*
  CELLS, CULTURED
    ESTRADIOL, 7192
    GONADOTROPINS, CHORIONIC, 7192
    PROGESTERONE, 7192
  COPPER MINE
    HISTOLOGICAL STUDY, 7144*
  COPPER SMELTER
    HISTOLOGICAL STUDY, 7144*
  IGG

    - ANTIGEN-ANTIBODY COMPLEX, 6921
  - IMMUNE SERUMS
    - IGG, 6921
  - KIDNEY NEOPLASMS
    - CASE REPORT, 7034*
    - LUNG NEOPLASMS, 7034*
  - OCCUPATIONAL HAZARD
    - EPIDEMIOLOGY, MONTANA, 7144*
  - RESPIRATORY TRACT NEOPLASMS
    - URANIUM, 7116
  - SILICA
    - EPIDEMIOLOGY, MONTANA, 7144*

- CARCINOMA, DUCTAL
  - PANCREATIC NEOPLASMS
    - PROPYLAMINE, 2-HYDROXY-N-NITROSOBIS-, 6684

- CARCINOMA, EHRLICH TUMOR
  - ALKALINE PHOSPHATASE
    - HISTONES, 7167
  - HISTONES
    - CELL CYCLE KINETICS, 7167
    - PHOSPHORYLATION, 7167
  - IMMUNOSUPPRESSION
    - MITOSIS, 7048*
  - PEPTIDE CHAIN INITIATION
    - INHIBITORY FACTOR, ISOLATION, 7169
  - RADIATION
    - CHROMOSOME ABERRATIONS, 6807*
  - RNA, NEOPLASM
    - ETHIDIUM BROMIDE, 7173
    - RIBONUCLEASE, 7173
    - RNA, MESSENGER, 7173
  - TRANSPLANTATION, HETEROLOGOUS
    - G-BANDING, 7048*
    - MITOSIS, 7048*

- CARCINOMA, EMBRYONAL
  - SEE TERATOID TUMOR

- CARCINOMA, EPIDERMOID
  - BENZ(A)ANTHRACENE, 7,12-DIMETHYL-
    - ALKALINE PHOSPHATASE, 6689
    - CARCINOGENIC ACTIVITY, 6689
  - BLADDER NEOPLASMS
    - CASE REPORT, 6992
  - BRAIN NEOPLASMS
    - CASE REPORT, 7065*
  - BREAST NEOPLASMS
    - CASE REPORT, 6971
  - CERVIX NEOPLASMS
    - CARCINOEMBRYONIC ANTIGEN, 6975
    - CELL DIFFERENTIATION, 6974
    - NEOPLASM METASTASIS, 6974
    - ULTRASTRUCTURAL STUDY, 6974
  - CHALONES
    - COLCHICINE, N-DEACETYL-N-METHYL-, 7157
    - MITOSIS, 7157
  - LARYNGEAL NEOPLASMS
    - MYOBLASTOMA, 6990
  - LUNG NEOPLASMS
    - SMOKING, 7112
  - MOUTH NEOPLASMS
    - EPIDEMIOLOGY, 7110
  - OVARIAN NEOPLASMS
    - ANTIGENS, NEOPLASM, 6926
  - SPLENIC NEOPLASMS
    - DIETHYLAMINE, N-NITROSO-, 7094*
  - 12-O-TETRADECANOYLPHORBOL-13-ACETATE
    - BENZ(A)ANTHRACENE, 7,12-DIMETHYL-, 6745*

- CARCINOMA IN SITU
  - BREAST NEOPLASMS
    - MUCIN, 6972
    - PRECANCEROUS CONDITIONS, 7136*
  - ESOPHAGEAL NEOPLASMS
    - EPIDEMIOLOGY, JAPAN, 7131*
    - HISTOLOGICAL STUDY, 7131*

- CARCINOMA, MUCINOUS
  - COLONIC NEOPLASMS
    - CASE REPORT, 6973
  - GALLBLADDER NEOPLASMS
    - HISTOCHEMICAL STUDY, 7072*
    - ULTRASTRUCTURAL STUDY, 7072*
  - INTESTINAL NEOPLASMS
    - ISOANTIGENS, 7091*
  - OVARIAN NEOPLASMS
    - MUCOPOLYSACCHARIDES, 7025*
    - ULTRASTRUCTURAL STUDY, 6969
  - PANCREATIC NEOPLASMS
    - CASE REPORT, 7074*
  - SKIN NEOPLASMS
    - NEOPLASM TRANSPLANTATION, 6973

- CARCINOMA, OAT CELL
  - LUNG NEOPLASMS
    - SMOKING, 7112
  - RESPIRATORY TRACT NEOPLASMS
    - URANIUM, 7116

- CARCINOMA, PAPILLARY
  - BLADDER NEOPLASMS
    - CHROMOSOME ABNORMALITIES, 6993
  - OVARIAN NEOPLASMS
    - MUCOPOLYSACCHARIDES, 7025*
  - VAGINAL NEOPLASMS
    - CASE REPORT, 6970
    - DIAGNOSIS AND TREATMENT, 6970
    - ULTRASTRUCTURAL STUDY, 6970

- CARCINOMA, RENAL CELL
  - SEE ADENOCARCINOMA

- CARCINOMA, SCIRRHOUS
  - BREAST NEOPLASMS
    - NEOPLASMS, MULTIPLE PRIMARY, 7004

- CARCINOMA, SQUAMOUS CELL
  - SEE CARCINOMA, EPIDERMOID

- CARCINOMA, TRANSITIONAL CELL
  - BLADDER NEOPLASMS
    - 1-BUTANOL, 4-(BUTYLNITROSAMINO)-, 7031*
  - FALLOPIAN TUBE NEOPLASMS
    - CASE REPORT, 6968
    - NEOPLASMS, MULTIPLE PRIMARY, 6968

- CARCINOSARCOMA
  - BREAST NEOPLASMS
    - CASE REPORT, 6971

- CARRIER PROTEINS
  - AMINO ACIDS

        - LIVER, MOUSE, 6760*
    - CHOLANTHRENE, 3-METHYL-
        - LIVER, MOUSE, 6760*
    - POLYCYCLIC HYDROCARBONS
        - LIVER, MOUSE, 6760*

- CELL ADHESION
    - NEOPLASM METASTASIS
        - REVIEW, 6658*
    - SARCOMA
        - IMMUNITY, CELLULAR, 6940*

- CELL AGGREGATION
    - CARBAMIC ACID, ETHYL ESTER
        - LIVER, RAT, 6717
        - RIBOSOMAL PROTEINS, 6717
    - LEUKEMIA, MYELOBLASTIC
        - BONE MARROW CELLS, 7154, 7197*
        - DRUG THERAPY, 7197*
        - PLANT AGGLUTININS, 7154
        - REMISSION, 7197*

- CELL DIFFERENTIATION
    - ANEMIA, APLASTIC
        - REVIEW, 6623
    - BRONCHIAL NEOPLASMS
        - CARCINOMA, 6988
    - CADMIUM CHLORIDE
        - PROSTATE, RAT, 6781*
    - CERVIX NEOPLASMS
        - CARCINOMA, EPIDERMOID, 6974
        - RADIOBIOLOGY, 6974
    - GENETICS
        - REVIEW, 6640
    - LEUKEMIA, HAIRY CELL
        - CASE REPORT, 7070*
        - HISTIOCYTES, 7070*
        - MONOCYTES, 7070*
    - LEUKEMIA, MYELOBLASTIC
        - BONE MARROW CELLS, 7197*
        - DRUG THERAPY, 7197*
        - MATHEMATICAL MODEL, 7193*
        - PRECANCEROUS CONDITIONS, 6994
        - REVIEW, 6623
    - LEUKEMIA, MYELOCYTIC
        - DEXAMETHASONE, 6950*
        - ESTRADIOL, 6950*
        - IMMUNOGLOBULINS, SURFACE, 6950*
        - LEUKOCYTES, 6950*
        - LYMPHOCYTES, 6950*
        - MACROPHAGES, 6950*
        - PREDNISOLONE, 6950*
    - B-LYMPHOCYTES
        - COMPLEMENT, 6931
        - FETUS, MOUSE, 6949*
        - IMMUNOGLOBULINS, FC, 6931
    - MELANOMA
        - PIGMENTATION, REVIEW, 6935*
        - ULTRASTRUCTURAL STUDY, REVIEW, 6657*
    - NEOPLASMS
        - AGING, REVIEW, 6659*
    - NEOPLASMS, EMBRYONAL AND MIXED
        - COLCHICINE, N-DEACETYL-N-METHYL-, 7152
        - CYTOCHALASIN B, 7152
        - HYBRID CELLS, 7152
    - NEOPLASMS, EXPERIMENTAL
        - ULTRASTRUCTURAL STUDY, REVIEW, 6657*
    - NEPHROBLASTOMA
        - TRANSPLANTATION, EMBRYONAL TISSUE, 7033*
    - NEUROBLASTOMA
        - CHILD, 7015
    - PINEALOMA
        - VIRUS, JC PAPOVA, 6903*
    - POLYNUCLEOTIDES
        - REVIEW, 6640
    - RNA
        - REVIEW, 6640
    - TERATOID TUMOR
        - CLONE CELLS, 7152
    - TESTOSTERONE
        - PROSTATE, RAT, 6781*

- CELL DIVISION
    - CELL TRANSFORMATION, NEOPLASTIC
        - CELL CYCLE KINETICS, REVIEW, 6664*
    - FIBROBLASTS
        - CELL CYCLE KINETICS, REVIEW, 6655*
    - HELA CELLS
        - CELL CYCLE KINETICS, REVIEW, 6655*
    - HEMATOPOIETIC STEM CELLS
        - CELL TRANSFORMATION, NEOPLASTIC, REVIEW, 6664*
    - LIVER NEOPLASMS
        - ACETAMIDE, N-FLUOREN-2-YL-, 6728*
        - SIDEROSIS, 6728*

- CELL FUSION
    - VIRUS, HERPES SIMPLEX
        - THYMIDINE KINASE, 6870

- CELL MEMBRANE
    - ASTROCYTOMA
        - ANTIGENS, NEOPLASM, 7141*
        - HISTOCOMPATIBILITY ANTIGENS, 7141*
    - BUTYRIC ACID, 2-AMINO-4-(ETHYLTHIO)-
        - CELL TRANSFORMATION, NEOPLASTIC, 6741*
        - OXIDOREDUCTASES, 6741*
        - RIBOSOMES, 6741*
    - CELL TRANSFORMATION, NEOPLASTIC
        - ULTRASTRUCTURAL STUDY, REVIEW, 6657*
    - DNA NUCLEOTIDYLTRANSFERASES
        - LIVER REGENERATION, 7185
    - HEPATOMA
        - COMPLEMENT, 6952*
        - HYBRID CELLS, 7163
        - IMMUNOGLOBULINS, 6952*
    - HORMONES
        - RECEPTORS, 6637
    - INSULIN
        - HORMONES, 6637
        - RECEPTORS, 6637
    - IODINE RADIOISOTOPES
        - CELL CYCLE KINETICS, 6819*
    - L CELLS
        - HYBRID CELLS, 7163
    - LEUKEMIA
        - HISTOCOMPATIBILITY ANTIGENS, 7141
    - NEUROBLASTOMA
        - ANTIGENS, NEOPLASM, 7141*
        - HISTOCOMPATIBILITY ANTIGENS, 7141
    - POLYCYCLIC HYDROCARBONS
        - AZAGUANINE REISTANCE, REVIEW, 664

    - OUABAIN RESISTANCE, REVIEW, 6641
    - TEMPERATURE RESISTANCE, REVIEW, 6641
- RADIATION, IONIZING
    - IODINE RADIOISOTOPES, 6819*
- RHABDOMYOSARCOMA
    - ANTIGENS, NEOPLASM, 7141*
    - HISTOCOMPATIBILITY ANTIGENS, 7141*
- SARCOMA, OSTEOGENIC
    - ANTIGENS, NEOPLASM, 7141*
    - HISTOCOMPATIBILITY ANTIGENS, 7141*
- VIRUS, RAUSCHER MURINE LEUKEMIA
    - ERYTHROCYTES, 6846
- VIRUS, ROUS SARCOMA
    - BINDING, 6877*
    - CELL TRANSFORMATION, NEOPLASTIC, 6647*
- VIRUS, SV40
    - CELL TRANSFORMATION, NEOPLASTIC, 6647*
    - TEMPERATURE SENSITIVE MUTANTS, 6882*

CELL NUCLEUS
- DIETHYLAMINE, N-NITROSO-
    - RNA POLYMERASE, 6766*

CELL TRANSFORMATION, NEOPLASTIC
- ANTHRANILIC ACID, 4-CHLORO-N-FURFURYL-5-SULFAMOYL-
    - POTASSIUM, 7158
- ANTIGEN-ANTIBODY REACTIONS
    - IMMUNE RESPONSE, REVIEW, 6621
- ATAXIA TELANGIECTASIA
    - ANIMAL MODEL, MOUSE, 7085*
- BENZ(A)ANTHRACENE, 7,12-DIMETHYL-
    - CHROMOSOME ABERRATIONS, 6650*
- BENZENAMINE, N,N-DIMETHYL-4-((3-METHYLPHENYL)AZO)-
    - CHROMATIN, 6687
    - NUCLEOPROTEINS, 6687
    - RNA POLYMERASE, 6687
- BENZO(A)PYRENE
    - FIBROBLASTS, REVIEW, 6646*
- BLEOMYCIN
    - FIBRINOLYSIS, 6758*
    - GLYCOPROTEINS, 6758*
- BUTYRIC ACID, 2-AMINO-4-(ETHYLTHIO)-
    - ADENINE, 6741*
    - CELL MEMBRANE, 6741*
- CACHEXIA
    - METABOLISM, REVIEW, 6653*
- CALCIUM
    - DNA REPLICATION, 7160
- CARBOHYDRATES
    - METABOLISM, REVIEW, 6653*
- CARCINOGEN, CHEMICAL
    - SCREENING TESTS, REVIEW, 6603
- CELL DIVISION
    - CELL CYCLE KINETICS, REVIEW, 6664*
- CELL MEMBRANE
    - ULTRASTRUCTURAL STUDY, REVIEW, 6657*
- CHOLANTHRENE, 3-METHYL-
    - FIBRINOLYSIS, 6758*
    - GLYCOPROTEINS, 6758*
    - OXIDOREDUCTASES, 6692
- CHROMOSOME ABERRATIONS
    - REVIEW, 6650*
- CYTOPLASM
    - ULTRASTRUCTURAL STUDY, REVIEW, 6657*
- ESTRADIOL
    - METABOLISM, AGE FACTORS, 6787*
- ESTRONE
    - METABOLISM, AGE FACTORS, 6787*
- HEREDITARY DISEASES
    - CHROMATID EXCHANGES, 7057*
- HISTOCOMPATIBILITY ANTIGENS
    - IMMUNE RESPONSE, REVIEW, 6621
- HYBRID CELLS
    - REVIEW, 6663*
- IMMUNOSUPPRESSION
    - IMMUNE RESPONSE, REVIEW, 6621
- LEUKEMIA
    - CHROMOSOME ABERRATIONS, 6650*
- LIPIDS
    - METABOLISM, REVIEW, 6653*
- T-LYMPHOCYTES
    - IMMUNE RESPONSE, REVIEW, 6621
- MACROPHAGES
    - IMMUNE RESPONSE, REVIEW, 6621
- NITROGEN
    - METABOLISM, REVIEW, 6653*
- OUABAIN
    - POTASSIUM, 7158
- PROTEINS
    - METABOLISM, REVIEW, 6653*
- SMOKING
    - FIBRINOLYSIS, 6758*
    - GLYCOPROTEINS, 6758*
- 4,4'-STILBENEDIOL, ALPHA,ALPHA'-DIETHYL-
    - CHROMOSOME ABERRATIONS, 6650*
- THYMUS GLAND
    - IMMUNITY, CELLULAR, 6933*
- TRANSPLANTATION, HOMOLOGOUS
    - IMMUNITY, CELLULAR, 6933*
    - VIRUS, POLYOMA, 6933*
- TURBELLARIA
    - NUCLEIC ACIDS, 7097*
- URIDINE, 2'-DEOXY-5-FLUORO-
    - CELLS, CULTURED, 6758*
    - FIBRINOLYSIS, 6758*
    - GLYCOPROTEINS, 6758*
- VIRUS, ABELSON MURINE LEUKEMIA
    - BONE MARROW CELLS, 6884*
    - ETHANOL, 2-MERCAPTO-, 6884*
    - STRAIN DIFFERENCE, 6884*
- VIRUS, ADENO 2
    - RNA, MESSENGER, 6865
    - RNA, VIRAL, 6865
- VIRUS, AVIAN ERYTHROBLASTIC LEUKOSIS
    - BONE MARROW CELLS, 6830
    - FIBROBLASTS, 6830
    - VIRUS, HELPER, 6830
- VIRUS, C-TYPE RNA TUMOR
    - XENOTROPIC AND ECOTROPIC VIRUSES, REVIEW, 6619
- VIRUS, EPSTEIN-BARR
    - LYMPHOCYTES, 6906*
- VIRUS, FRIEND MURINE LEUKEMIA
    - SPLEEN, 6885*
- VIRUS, HERPES SIMPLEX
    - THYMIDINE KINASE, 6870
- VIRUS, HERPES SIMPLEX 2
    - ULTRASTRUCTURAL STUDY, 6912*
- VIRUS, KIRSTEN MURINE SARCOMA-LEUKEMIA

- VIRAL PROTEINS, 6841
- VIRUS, MOLONEY MURINE LEUKEMIA
  - VIRUS REPLICATION, 6883*
- VIRUS, MURINE LEUKEMIA
  - AGE FACTORS, 6838
  - SEX FACTORS, 6838
- VIRUS, PAPOVA
  - ANTIGENS, VIRAL, 6858
- VIRUS, PAPOVA, BK
  - ANTIGENS, VIRAL, 6858
- VIRUS, POLYOMA
  - GLYCOPROTEINS, 6864
  - MUCOPOLYSACCHARIDES, 6864
- VIRUS, RADIATION LEUKEMIA
  - BONE MARROW CELLS, 6839
  - RADIATION, IONIZING, 6839
  - THYMUS NEOPLASMS, 6839
- VIRUS, RAUSCHER MURINE LEUKEMIA
  - FREUND'S ADJUVANT, 6889*
- VIRUS, RNA TUMOR
  - HYBRID CELLS, 6663*
  - VIRUS-LIKE PARTICLES, 6900*
- VIRUS, ROUS SARCOMA
  - CHROMOSOME ABERRATIONS, 6650*
  - GLYCOPROTEINS, 6864
  - MUCOPOLYSACCHARIDES, 6864
  - TEMPERATURE SENSITIVE MUTANTS, 6831
- VIRUS, SV40
  - ANTIGENS, VIRAL, 6852, 6858, 6878*
  - BENZ(A)ANTHRACENE, 7,12-DIMETHYL-, 6751*
  - BENZO(A)PYRENE, 6751*
  - C-TYPE PARTICLES, 6852
  - CHOLESTEROL, 6911*
  - CHROMOSOMES, 6879*
  - DNA, 6879*
  - DNA REPLICATION, 6855, 6880*, 6881*
  - DNA, VIRAL, 6851
  - FIBROBLASTS, REVIEW, 6646*
  - LIPOPROTEINS, 6911*
  - MITOSIS, 6855
  - OXIDOREDUCTASES, 6911*
  - POLYPLOIDY, 6881*
  - POTASSIUM, 7158
  - RNA, MESSENGER, 6851
  - RNA, VIRAL, 6851, 6852
  - TEMPERATURE SENSITIVE MUTANTS, 6882*
  - TISSUE CULTURE, 6852
  - VIRUS REPLICATION, 6883*
- WOUNDS AND INJURIES
  - TURBELLARIA, 7097*

CELLS, CULTURED
- BREAST NEOPLASMS
  - DNA, 7162
  - KARYOTYPING, 7162
  - MEIOSIS, 7162
- CADMIUM CHLORIDE
  - PROSTATE, RAT, 6781*
- CARCINOMA, BRONCHOGENIC
  - ESTRADIOL, 7192
  - GONADOTROPINS, CHORIONIC, 7192
  - PROGESTERONE, 7192
- CHORIOCARCINOMA
  - ESTRADIOL, 7192
  - GONADOTROPINS, CHORIONIC, 7192
  - PROGESTERONE, 7192
- COLONIC NEOPLASMS
  - ADENOCARCINOMA, 7195*
  - CARCINOEMBRYONIC ANTIGEN, 7195*
  - ULTRASTRUCTURAL STUDY, 7195*
- CYTOCHROME P-450
  - BENZO(A)PYRENE, 6696
- FIBROSARCOMA
  - DNA REPLICATION, 7160
- GYNECOLOGIC NEOPLASMS
  - DNA, 7162
  - KARYOTYPING, 7162
  - MEIOSIS, 7162
- HEMANGIOENDOTHELIOMA
  - DNA REPLICATION, 7160
- IMMUNITY, CELLULAR
  - TRANSPLANTATION IMMUNOLOGY, 6901*
- LEUKEMIA
  - RADIATION, IONIZING, 6811*
- LEUKEMIA, MYELOCYTIC
  - MURAMIDASE, 7187
- LYMPHOMA
  - MURAMIDASE, 7187
- MACROPHAGES
  - MURAMIDASE, 7187
- MELANOMA
  - DNA, 7162
  - GLUCOSEPHOSPHATE DEHYDROGENASE, 7194*
  - KARYOTYPING, 7162, 7194*
  - MEIOSIS, 7162
  - MELANIN, 7194*
  - PHOSPHOGLUCOMUTASE, 7194*
- PITUITARY NEOPLASMS
  - HORMONES, 6733*
- POLYCYCLIC HYDROCARBONS
  - MUTAGENIC ACTIVITY, REVIEW, 6641
- RNA, TRANSFER
  - AMINO ACIDS, 7170
- RNA, TRANSFER, METHYLTRANSFERASES
  - AMINO ACIDS, 7170
- SARCOMA, RETICULUM CELL
  - MURAMIDASE, 7187
- TESTOSTERONE
  - PROSTATE, RAT, 6781*
- URIDINE, 5-BROMO-2'-DEOXY-
  - MELANOMA, 6633
- URIDINE, 2'-DEOXY-5-FLUORO-
  - CELL TRANSFORMATION, NEOPLASTIC, 6758*

CELLULAR INCLUSIONS
- KIDNEY NEOPLASMS
  - VIRUS, LEOPARD FROG CARCINOMA, 7196*
- LEUKEMIA, HAIRY CELL
  - CASE REPORT, 6998
  - HOVIG TYPE, 6998
  - ULTRASTRUCTURAL STUDY, 6998
- LEUKEMIA, LYMPHOCYTIC
  - IMMUNOGLOBULINS, LIGHT CHAIN, 7080*
- LYMPHOMA
  - CASE REPORT, 7073*
- NEUROEPITHELIOMA
  - ULTRASTRUCTURAL STUDY, 7163
- STOMACH NEOPLASMS
  - ULTRASTRUCTURAL STUDY, 7019

- CENTRAL NERVOUS SYSTEM
  - BURKITT'S LYMPHOMA
    - EPIDEMIOLOGY, UGANDA, 7132*

- CEREBELLAR NEOPLASMS
  - GLIOMA
    - DNA REPLICATION, 7126*

- CERVIX NEOPLASMS
  - BENZO(A)PYRENE
    - PRECANCEROUS CONDITIONS, 6976
    - ULTRASTRUCTURAL STUDY, MOUSE, 6976
  - CARCINOEMBRYONIC ANTIGEN
    - ISOLATION AND CHARACTERIZATION, 6975
  - CARCINOMA
    - AGE FACTORS, 7142*
    - BENZO(A)PYRENE, 6976
    - PRECANCEROUS CONDITIONS, 7142*
    - ULTRASTRUCTURAL STUDY, MOUSE, 6976
    - VIRUS, HERPES SIMPLEX 2, 6622
  - CARCINOMA, EPIDERMOID
    - CARCINOEMBRYONIC ANTIGEN, 6975
    - CELL DIFFERENTIATION, 6974
    - NEOPLASM METASTASIS, 6974
    - ULTRASTRUCTURAL STUDY, 6974
  - CELL DIFFERENTIATION
    - RADIOBIOLOGY, 6974
  - CONTRACEPTIVES, ORAL
    - EPIDEMIOLOGY, 7143*
  - EPIDEMIOLOGY
    - SOUTH AFRICA, 7128*
  - INTRAUTERINE DEVICES
    - EPIDEMIOLOGY, 7143*
  - NEOPLASM METASTASIS
    - RADIOBIOLOGY, 6974
  - RADIATION, IONIZING
    - DIAGNOSIS AND PROGNOSIS, 6974
  - UTERINE NEOPLASMS
    - AGE FACTORS, 7142*
  - VIRUS, GENITAL WART
    - CARCINOGENIC POTENTIAL, 6617
  - VIRUS, HERPES SIMPLEX 2
    - CARCINOGENIC POTENTIAL, 6617

- CHALONES
  - ADENOCARCINOMA
    - MITOSIS, 7157
  - CARCINOMA, EPIDERMOID
    - COLCHICINE, N-DEACETYL-N-METHYL-, 7157
    - MITOSIS, 7157
  - CHOLANTHRENE, 3-METHYL-
    - CELL CYCLE KINETICS, 6761*
    - EPIDERMIS, MOUSE, 6761*
  - RESPIRATORY TRACT NEOPLASMS
    - COLCHICINE, N-DEACETYL-N-METHYL-, 7157
    - MITOSIS, 7157

- CHEMOTAXIS
  - NEOPLASMS, EXPERIMENTAL
    - BENZ(A)ANTHRACENE, 7,12-DIMETHYL-, 6939*
    - MACROPHAGES, 6939*

- CHLOROFORM
  - AIR POLLUTANTS
    - CHROMATOGRAPHIC ANALYSIS, 6737*
  - HEPATOMA
    - DOSE-RESPONSE STUDY, RAT, MOUSE, 6738*
  - HISTOLOGICAL STUDY, RAT, MOUSE
    - HEPATOMA, 6738*
  - KIDNEY NEOPLASMS
    - DOSE-RESPONSE STUDY, RAT, MOUSE, 6738*
    - HISTOLOGICAL STUDY, RAT, MOUSE, 6738*

- CHOLANGIOMA
  - CONTRACEPTIVES, ORAL
    - CASE REPORT, 7006

- CHOLANTHRENE, 3-METHYL-
  - ARYL HYDROCARBON HYDROXYLASES
    - LIVER, RAT, 6748*
  - BENZO(A)PYRENE
    - BINDING, CHROMATIN, 6697
    - DIOL EPOXIDES, 6695
    - HYDROXYLATION, 6757*
  - BENZO(A)PYRENE-4,5-OXIDE
    - EPOXIDE REDUCTION, 6691
  - CARRIER PROTEINS
    - LIVER, MOUSE, 6760*
  - CHALONES
    - CELL CYCLE KINETICS, 6761*
    - EPIDERMIS, MOUSE, 6761*
  - DNA REPLICATION
    - EPIDERMIS, MOUSE, 6761*
  - FIBRINOLYSIS
    - CELL TRANSFORMATION, NEOPLASTIC, 6758*
  - FIBROSARCOMA
    - COLLAGENOLYTIC ACTIVITY, 6759*
    - ISOANTIBODIES, 6924
    - TRANSPLANTATION IMMUNOLOGY, 6924
  - GLYCOPROTEINS
    - CELL TRANSFORMATION, NEOPLASTIC, 6758*
  - LIVER NEOPLASMS
    - CARCINOGENIC ACTIVITY, 6723*
  - MICROSOMES, LIVER
    - ARYL HYDROCARBON HYDROXYLASES, 6757*
  - OXIDOREDUCTASES
    - CELL TRANSFORMATION, NEOPLASTIC, 6692
    - CYTOCHROME P-450, 6692
  - SARCOMA
    - CYTOCHROME P-450, 6692
    - IMMUNITY, CELLULAR, 6940*
    - OXIDOREDUCTASES, 6692
  - STOMACH NEOPLASMS
    - ANIMAL MODEL, HAMSTER, 6762*
    - DIETHYLAMINE, N-NITROSO-, 6762*
  - TESTOSTERONE
    - PROSTATE, RAT, 6782*

- CHOLEST-5-EN-3BETA-AMINE
  - AMARANTH
    - DOSE-RESPONSE STUDY, 6742*
    - TOXIC EFFECTS, RAT, 6742*
  - CYCLOHEXANESULFONIC ACID, MONOSODIUM SALT
    - DOSE-RESPONSE STUDY, 6742*
    - TOXIC EFFECTS, RAT, 6742*

- CHOLESTEROL
  - HYPERCHOLESTEREMIA
    - FIBROBLASTS, 6911*
  - LIVER NEOPLASMS
    - CARCINOGENIC ACTIVITY, 6723*
  - VIRUS, SV40
    - CELL TRANSFORMATION, NEOPLASTIC, 6911*

- CHOLINE ACETATE (ESTER)
  - BRAIN NEOPLASMS
    - CLONE CELLS, 6767*

- CHONDROSARCOMA
  - ESOPHAGEAL NEOPLASMS
    - CASE REPORT, 7036*
  - GLYCOSAMINOGLYCANS
    - CASE REPORT, 7165
  - PROTEOGLYCANS
    - CASE REPORT, 7165

- CHORIOCARCINOMA
  - CELLS, CULTURED
    - ESTRADIOL, 7192
    - GONADOTROPINS, CHORIONIC, 7192
    - PROGESTERONE, 7192

- CHROMATIDS
  - ATAXIA TELANGIECTASIA
    - ACTINOMYCIN D, 7078*

- CHROMATIN
  - BENZENAMINE, N,N-DIMETHYL-4-((3-METHYLPHENYL)AZO)-
    - CELL TRANSFORMATION, NEOPLASTIC, 6687
    - LIVER, RAT, 6677, 6687
    - RNA POLYMERASE, 6677
  - BENZO(A)PYRENE
    - BINDING, 6697
  - LEUKEMIA, MYELOCYTIC
    - ULTRASTRUCTURAL STUDY, REVIEW, 6629

- CHROMOSOME ABERRATIONS
  - BENZ(A)ANTHRACENE, 7,12-DIMETHYL-
    - CELL TRANSFORMATION, NEOPLASTIC, 6650*
  - CARCINOMA, EHRLICH TUMOR
    - RADIATION, 6807*
  - CELL TRANSFORMATION, NEOPLASTIC
    - REVIEW, 6650*
  - CHROMOSOMES, HUMAN, 21-22
    - REVIEW, 6650*
  - DNA
    - C-BANDING, PEROMYSCUS, 7056*
  - ETHYLENE, CHLORO-
    - OCCUPATIONAL HAZARD, 6671
  - HETEROCHROMATIN
    - C-BANDING, PEROMYSCUS, 7056*
  - LEUKEMIA
    - BONE MARROW CELLS, 6802
    - CELL TRANSFORMATION, NEOPLASTIC, 6650*
    - PRECANCEROUS CONDITIONS, 6802
    - REVIEW, 6650*
  - LEUKEMIA, MYELOBLASTIC
    - CASE REPORT, 7058*
    - CHROMOSOMES, HUMAN, 16-18, 7059*
    - CHROMOSOMES, HUMAN, 21-22, 7059*
    - G-BANDING, 6960
    - KARYOTYPING, 6960
  - LEUKEMIA, MYELOCYTIC
    - CHROMOSOMES, HUMAN, 6-12, 6964
    - CHROMOSOMES, HUMAN, 21-22, 6964, 7059*
    - ULTRASTRUCTURAL STUDY, REVIEW, 6629
  - LYMPHOMA
    - REVIEW, 6650*
  - PROMETHIUM
    - METABOLISM, HAMSTER, 6816*
    - RADIOISOTOPES, 6816*
  - RADIATION, IONIZING
    - CHROMOSOME ABNORMALITIES, 6824*
    - RADIATION GENETICS, REVIEW, 6643*
    - STATISTICAL ANALYSIS, 6824*
  - 4,4'-STILBENEDIOL, ALPHA,ALPHA'-DIETHYL-
    - CELL TRANSFORMATION, NEOPLASTIC, 6650*
  - VIRUS, ROUS SARCOMA
    - CELL TRANSFORMATION, NEOPLASTIC, 6650*

- CHROMOSOME ABNORMALITIES
  - ANEMIA, APLASTIC
    - REVIEW, 6623
  - ATAXIA TELANGIECTASIA
    - ANIMAL MODEL, MOUSE, 7085*
  - BLADDER NEOPLASMS
    - CARCINOMA, PAPILLARY, 6993
    - CASE REPORT, 6993
    - NEOPLASM RECURRENCE, LOCAL, 6993
  - HODGKIN'S DISEASE
    - CHROMOSOMES, HUMAN, 13-15, 7060*
  - LEUKEMIA, MYELOBLASTIC
    - REVIEW, 6623
  - LYMPHOMA
    - BENZ(A)ANTHRACENE, 7,12-DIMETHYL-, 7085*
    - PRECANCEROUS CONDITIONS, 7075*
  - LYMPHOMA, GIANT FOLLICULAR
    - CHROMOSOMES, HUMAN, 13-15, 7060*
  - LYMPHOSARCOMA
    - CHROMOSOMES, HUMAN, 13-15, 7060*
  - NEOPLASMS, EMBRYONAL AND MIXED
    - COLCHICINE, N-DEACETYL-N-METHYL-, 7152
    - CYTOCHALASIN B, 7152
  - RADIATION, IONIZING
    - CHROMOSOME ABERRATIONS, 6824*
  - SARCOMA, RETICULUM CELL
    - CHROMOSOMES, HUMAN, 13-15, 7060*
  - TERATOID TUMOR
    - CLONE CELLS, 7152

- CHROMOSOMES
  - CARCINOGEN, CHEMICAL
    - KARYOTYPING, 6671
  - COLONIC NEOPLASMS
    - HYDRAZINE, 1,2-DIMETHYL-, 6704
  - LEUKEMIA, LYMPHOBLASTIC
    - CYTOGENETICS, CHILD, 6963
  - LEUKEMIA, MYELOBLASTIC
    - CYTOGENETICS, CHILD, 6963
  - RETINOBLASTOMA
    - GENETICS, 7055*

  VIRUS, SV40
    CELL TRANSFORMATION, NEOPLASTIC, 6879*
    REVERTANT CELL LINES, 6879*

CHROMOSOMES, HUMAN, 6-12
  LEUKEMIA, MYELOCYTIC
    CHROMOSOME ABERRATIONS, 6964

CHROMOSOMES, HUMAN, 13-15
  HODGKIN'S DISEASE
    CHROMOSOME ABNORMALITIES, 7060*
  LYMPHOMA, GIANT FOLLICULAR
    CHROMOSOME ABNORMALITIES, 7060*
  LYMPHOSARCOMA
    CHROMOSOME ABNORMALITIES, 7060*
  SARCOMA, RETICULUM CELL
    CHROMOSOME ABNORMALITIES, 7060*

CHROMOSOMES, HUMAN, 16-18
  LEUKEMIA, MYELOBLASTIC
    CHROMOSOME ABERRATIONS, 7059*

CHROMOSOMES, HUMAN, 21-22
  CHROMOSOME ABERRATIONS
    CHROMOSOME ABBERATIONS, 7059*
    REVIEW, 6650*
  LEUKEMIA, MYELOCYTIC
    CHROMOSOME ABERRATIONS, 6964, 7059*

CHRYSENE
  LUNG
    RETENTION, MOUSE, HAMSTER, 6752*
  SKIN
    RETENTION, MOUSE, HAMSTER, 6752*

CHRYSOTILE
  SEE ASBESTOS

CICATRIX
  BREAST NEOPLASMS
    PRECANCEROUS CONDITIONS, 7021*

CLONE CELLS
  BRAIN NEOPLASMS
    BUTYRIC ACID, 4-AMINO-, 6767*
    CHOLINE ACETATE (ESTER), 6767*
    CREATINE KINASE, 6767*
    MEMBRANE POTENTIALS, 6767*
    MICROTUBULES, 6767*
  NEOPLASMS, EMBRYONAL AND MIXED
    CARCINOGENIC POTENTIAL, 7152
  TERATOID TUMOR
    CELL DIFFERENTIATION, 7152
    CHROMOSOME ABNORMALITIES, 7152

COLCHICINE
  L CELLS
    AGGLUTINATION, 6955*

COLCHICINE, N-DEACETYL-N-METHYL-
  CARCINOMA, EPIDERMOID
    CHALONES, 7157
  NEOPLASMS, EMBRYONAL AND MIXED
    CELL DIFFERENTIATION, 7152
    CHROMOSOME ABNORMALITIES, 7152
  RESPIRATORY TRACT NEOPLASMS
    CHALONES, 7157

COLIPHAGES
  ULTRAVIOLET RAYS
    DNA REPLICATION, 6815*

COLITIS, ULCERATIVE
  COLONIC NEOPLASMS
    PRECANCEROUS CONDITIONS, 7108

COLLAGEN
  EPITHELIAL CELLS
    CELL TRANSFORMATION, NEOPLASTIC, REVIEW, 6660*
  NEOPLASMS, CONNECTIVE TISSUE
    CELL TRANSFORMATION, NEOPLASTIC, REVIEW, 6660*

COLONIC NEOPLASMS
  ADENOCARCINOMA
    CELL LINE, 7195*
    HYDRAZINE, 1,2-DIMETHYL-, 6704
  BACTERIA
    DIETARY FIBER, REVIEW, 6607
  CARCINOEMBRYONIC ANTIGEN
    DIAGNOSIS AND PROGNOSIS, 7082*
  CARCINOMA
    HYDRAZINE, 1,2-DIMETHYL-, 6704
    IMMUNOSUPPRESSION, 6941*
    ISOANTIGENS, 7091*
    LYMPHOCYTES, 6941*
    NEOPLASM METASTASIS, 6941*, 7091*
  CARCINOMA, MUCINOUS
    CASE REPORT, 6973
  CELL LINE
    CARCINOEMBRYONIC ANTIGEN, 7195*
    ULTRASTRUCTURAL STUDY, 7195*
  COLITIS, ULCERATIVE
    PRECANCEROUS CONDITIONS, 7108
  ENTERITIS, REGIONAL
    PRECANCEROUS CONDITIONS, 7108
  GENETICS
    EPIDEMIOLOGY, REVIEW, 6612
  GLUTAMYL TRANSPEPTIDASE
    DIAGNOSIS AND PROGNOSIS, 7082*
  HYDRAZINE, 1,2-DIMETHYL-
    BACTERIA, 6703
    CHROMOSOMES, 6704
    EPITHELIUM, 6704
    RAT, GERM-FREE, 6703
  LACTATE DEHYDROGENASE
    DIAGNOSIS AND PROGNOSIS, 7082*
  METHANE, AZOXY-
    BACTERIA, 6703
    RAT, GERM-FREE, 6703
  POLYPS
    ISOANTIGENS, 7091*
  PRECANCEROUS CONDITIONS
    EPIDEMIOLOGY, REVIEW, 6612
  URETEROSIGMOIDOSTOMY
    CASE REPORT, 6973

COMPLEMENT
  HEPATOMA
    BINDING, 6952*
    CELL MEMBRANE, 6952*
  B-LYMPHOCYTES
    ALLOANTIGENS, 6931
    CELL DIFFERENTIATION, 6931
    IGG, 6931
    IGM, 6931

- CONCANAVALIN A
  - L CELLS
    - AGGLUTINATION, 6955*
  - LEUKEMIA, LYMPHOCYTIC
    - IMMUNE RESPONSE, 6996
  - VIRUS, RAUSCHER MURINE LEUKEMIA
    - ERYTHROCYTES, 6846

- CONTACT INHIBITION
  - HEPATOMA
    - HYBRID CELLS, 7163
  - L CELLS
    - HYBRID CELLS, 7163
  - PHOSPHATES
    - METABOLISM, 3T3 CELLS, 7198*

- CONTRACEPTIVES, ORAL
  - CERVIX NEOPLASMS
    - EPIDEMIOLOGY, 7143*
  - CHOLANGIOMA
    - CASE REPORT, 7006
  - HEPATOMA
    - CASE REPORT, 7006
  - MAMMARY NEOPLASMS, EXPERIMENTAL
    - CARCINOGENIC POTENTIAL, DOG, MONKEY, 6789*

- CORTICOTROPIN
  - PITUITARY NEOPLASMS
    - ANILINE, 2,4,6-TRIMETHYL-, 6733*

- CORTISOL
  - MICROSOMES, LIVER
    - CYTOCHROME P-450, 7190

- CORTISONE
  - LEUKEMIA, LYMPHOCYTIC
    - GRAFT VS HOST REACTION, 6929

- CORYNEBACTERIUM PARVUM
  - LUNG NEOPLASMS
    - NEOPLASM METASTASIS, 7159
    - NEOPLASM METASTASIS, REVIEW, 6649*

- CRANIOPHARYNGIOMA
  - BRAIN NEOPLASMS
    - EPIDEMIOLOGY, SOUTHWEST ASIA, 7130*

- CREATINE KINASE
  - BRAIN NEOPLASMS
    - CLONE CELLS, 6767*

- P-CRESOL
  - INTESTINAL NEOPLASMS
    - EXCRETION, URINE, 6724*
  - TYROSINE
    - METABOLISM, BACTERIA, 6724*

- CROCIDOLITE
  - SEE ASBESTOS

- CRYPTORCHISM
  - TESTICULAR NEOPLASMS
    - DISGERMINOMA, 7009
    - EPIDEMIOLOGY, 7009
    - LEYDIG CELL TUMOR, 7009

- CYANIDE
  - ARYL HYDROCARBON HYDROXYLASES
    - LIVER, RAT, 6748*

- CYCLIC AMP
  - SEE ADENOSINE CYCLIC 3',5' MONOPHOSPHATE

- CYCLOHEXANESULFONIC ACID, MONOSODIUM SALT
  - CHOLEST-5-EN-3BETA-AMINE
    - DOSE-RESPONSE STUDY, 6742*
    - TOXIC EFFECTS, RAT, 6742*

- CYCLOHEXIMIDE
  - RADIATION, IONIZING
    - CELL CYCLE KINETICS, HAMSTER OVARY, 6821*
  - VIRUS, EPSTEIN-BARR
    - VIRUS REPLICATION, 6907*

- CYCLOPHOSPHAMIDE
  - LEUKEMIA, MYELOBLASTIC
    - ARTHRITIS, RHEUMATOID, 7079*
    - CASE REPORT, 7079*
    - PRECANCEROUS CONDITIONS, 7079*
  - LUNG NEOPLASMS
    - NEOPLASM METASTASIS, 6791*, 7159
    - NEOPLASM METASTASIS, REVIEW, 6649*
    - SARCOMA, 6791*
  - SARCOMA, OSTEOGENIC
    - NEOPLASM METASTASIS, REVIEW, 6649*

- CYSTADENOCARCINOMA
  - OVARIAN NEOPLASMS
    - ANTIGENS, NEOPLASM, 6926

- CYSTADENOMA, MUCINOUS
  - OVARIAN NEOPLASMS
    - ANTIGENS, NEOPLASM, 6926
    - CHOLESTEROL, URINARY, 7003

- CYSTADENOMA, PAPILLARY
  - OVARIAN NEOPLASMS
    - CASE REPORT, 7027*
    - CHOLESTEROL, URINARY, 7003

- CYSTEINE
  - RADIATION, IONIZING
    - DNA REPLICATION, 6776*

- CYSTOSARCOMA PHYLLODES
  - BREAST NEOPLASMS
    - CASE REPORT, 6971

- CYTOCHALASIN B
  - NEOPLASMS, EMBRYONAL AND MIXED
    - CELL DIFFERENTIATION, 7152
    - CHROMOSOME ABNORMALITIES, 7152

- CYTOCHROME OXIDASE
  - AGING
    - MITOCHONDRIA, LIVER, 7095*

- CYTOCHROME P-450
  - ANILINE, P-CHLORO-
    - MICROSOMES, LIVER, 6690
    - THIOPYROPHOSPHORIC ACID, TETRAETHYL ESTER, 6690
  - ANILINE, 4,4'-SULFONYLDI-
    - MICROSOMES, LIVER, 6690

THIOPYROPHOSPHORIC ACID, TETRAETHYL ESTER, 6690
BENZENAMINE, N,N-DIMETHYL-4-((3-METHYLPHENYL)AZO)-
MICROSOMES, LIVER, 6729*
BENZO(A)PYRENE
OXYGENASES, 6696
BENZO(A)PYRENE-4,5-OXIDE
EPOXIDE REDUCTION, 6691
CELLS, CULTURED
BENZO(A)PYRENE, 6696
CHOLANTHRENE, 3-METHYL-
OXIDOREDUCTASES, 6692
CORTISOL
MICROSOMES, LIVER, 7190
INDOLINE, 2-METHYL-
MICROSOMES, LIVER, 6690
THIOPYROPHOSPHORIC ACID, TETRAETHYL ESTER, 6690
OXYGENASES
ENZYMATIC ACTIVITY, 6696
SARCOMA
CHOLANTHRENE, 3-METHYL-, 6692
SULFANILAMIDE
MICROSOMES, LIVER, 6690
THIOPYROPHOSPHORIC ACID, TETRAETHYL ESTER, 6690
TILORONE
MICROSOMES, LIVER, 6694

CYTOCHROME REDUCTASES
MICROSOMES, LIVER
DIET, 6750*
PEROXIDASES, 6750*

CYTOCHROMES
MICROSOMES, LIVER
DIET, 6750*

CYTOPATHOGENIC EFFECT, VIRAL
VIRUS, HERPES SIMPLEX 1
SILVER NITRATE, 6910*
VIRUS, HERPES SIMPLEX 2
SILVER NITRATE, 6910*

CYTOPLASM
CELL TRANSFORMATION, NEOPLASTIC
ULTRASTRUCTURAL STUDY, REVIEW, 6657*
DNA NUCLEOTIDYLTRANSFERASES
LIVER REGENERATION, 7185
PINEALOMA
VIRUS-LIKE PARTICLES, 6895*
VIRUS, FROG 3
POLY A, 6834

CYTOSINE, 1-BETA-D-ARABINOFURANOSYL-
LUNG NEOPLASMS
SARCOMA, 6791*

DEHYDROEPIANDROSTERONE
BREAST NEOPLASMS
SERUM LEVELS, 7191

DEOXYRIBONUCLEASE
DNA
HYDROGEN-ION CONCENTRATION, 6718
PURINES, 6718
SULFURIC ACID, DIMETHYL ESTER
DNA, 6718
THYMIDINE
DNA, 7179
UREA, METHYL NITROSO-
DNA, 6718
URIDINE, 5-BROMO-2'-DEOXY-
DNA, 7179

DEXAMETHASONE
DNA REPLICATION
FIBROBLASTS, REVIEW, 6646*
LEUKEMIA, MYELOCYTIC
CELL DIFFERENTIATION, 6950*
VIRUS, KIRSTEN MURINE SARCOMA
VIRUS REPLICATION, 6897*

DIABETES MELLITUS
BREAST NEOPLASMS
ADENOFIBROMA, 7136*
PAPILLOMA, 7136*
PRECANCEROUS CONDITIONS, 7136*

DIBENZ(A,H)ANTHRACENE
LUNG
RETENTION, MOUSE, HAMSTER, 6752*
PYRENE
RETENTION, MOUSE, HAMSTER, 6752*
SKIN
RETENTION, MOUSE, HAMSTER, 6752*

7H-DIBENZO(C,G)CARBAZOLE
LUNG
RETENTION, HAMSTER, 6754*
RESPIRATORY TRACT NEOPLASMS
DOSE-RESPONSE STUDY, HAMSTER, 6754*
PRECANCEROUS CONDITIONS, 6754*

DIENESTROL
UTERINE RECEPTORS
BINDING, 6716

DIET
BREAST NEOPLASMS
EPIDEMIOLOGY, REVIEW, 6624
IODINE, 7140*
DIVERTICULOSIS
FIBERS, REVIEW, 6608
GASTROINTESTINAL NEOPLASMS
EPIDEMIOLOGY, REVIEW, 6656*
INTESTINAL DISEASES
DIETARY FIBER, REVIEW, 6607
INTESTINAL NEOPLASMS
EPIDEMIOLOGY, REVIEW, 6610
FIBERS, REVIEW, 6608
MICROSOMES, LIVER
CYTOCHROME REDUCTASES, 6750*
CYTOCHROMES, 6750*
OXYGENASES, 6750*
PEROXIDASES, 6750*

DIETARY FATS
DIVERTICULOSIS
EPIDEMIOLOGY, REVIEW, 6608
HEART NEOPLASMS
MOUSE, 6775*
NEOPLASM METASTASIS, 6775*
INTESTINAL NEOPLASMS
EPIDEMIOLOGY, REVIEW, 6608

- DIETHYLAMINE, N-NITROSO-
  - BARBITURIC ACID, 5-ETHYL-5-PHENYL-
    - METABOLISM, LIVER, 6707
  - BILE DUCT NEOPLASMS
    - PRECANCEROUS CONDITIONS, 6707
  - CARBON TETRACHLORIDE
    - METABOLISM, LIVER, 6707
  - DIMETHYLAMINE, N-NITROSO-
    - HEPATOTOXICITY, 6764*
  - HEPATOMA
    - ALPHA-AMANITINE, 6766*
    - CARCINOGENIC ACTIVITY, RAT, 6765*, 6766*
    - DNA POLYMERASE, 6765*
    - REVERSE TRANSCRIPTASE, 6765*
    - RNA POLYMERASE, 6765*
  - LEUKEMIA
    - STRAIN DIFFERENCE, MOUSE, 6708
  - LIVER NEOPLASMS
    - HEMANGIOMA, 6707
    - STRAIN DIFFERENCE, MOUSE, 6708
  - LUNG NEOPLASMS
    - ENDOCRINE CELLS, 6709
    - PRECANCEROUS CONDITIONS, 6709
    - STRAIN DIFFERENCE, MOUSE, 6708
    - ULTRASTRUCTURAL STUDY, HAMSTER, 6709
  - RNA POLYMERASE
    - CARCINOGENIC ACTIVITY, RAT, 6766*
    - CELL NUCLEUS, 6766*
  - SPLENIC NEOPLASMS
    - CARCINOMA, EPIDERMOID, 7094*
    - POLYPS, 7094*
    - TRANSPLANTATION, HOMOLOGOUS, 7094*
  - STOMACH NEOPLASMS
    - ADENOCARCINOMA, 6762*
    - ANIMAL MODEL, HAMSTER, 6762*
    - CHOLANTHRENE, 3-METHYL-, 6762*
    - DIMETHYLAMINE, N-NITROSO-, 6762*
  - TRACHEAL NEOPLASMS
    - PAPILLOMA, 7094*
    - POLYPS, 7094*
    - TRANSPLANTATION, HOMOLOGOUS, 7094*

- DIETHYLNITROSAMINE
  - SEE DIETHYLAMINE, N-NITROSO-

- DIGESTIVE SYSTEM NEOPLASMS
  - LEAD
    - EPIDEMIOLOGY, 7118
    - OCCUPATIONAL HAZARD, 7118
  - SPORTS
    - EPIDEMIOLOGY, 6703

- DIMETHYLAMINE, N-NITROSO-
  - 1-BUTANAMINE, N-BUTYL-N-NITROSO-
    - HEPATOTOXICITY, 6764*
  - DIETHYLAMINE, N-NITROSO-
    - HEPATOTOXICITY, 6764*
  - DNA, SINGLE STRANDED
    - LIVER, RAT, 6714
  - ENVIRONMENTAL HAZARD
    - AIR POLLUTANTS, 6712
  - KIDNEY NEOPLASMS
    - CARCINOGENIC ACTIVITY, 6710
  - LIVER NEOPLASMS
    - CARCINOGENIC ACTIVITY, 6710
    - HEMANGIOMA, 6710
    - PRECANCEROUS CONDITIONS, 6728*
  - LUNG NEOPLASMS
    - CARCINOGENIC ACTIVITY, 6710
  - NUCLEIC ACIDS
    - CARCINOGENIC ACTIVITY, 6710
    - GUANINE, 6710
  - SARCOSINE, N-NITROSO-
    - HEPATOTOXICITY, 6764*
  - STOMACH NEOPLASMS
    - ANIMAL MODEL, HAMSTER, 6762*
    - DIETHYLAMINE, N-NITROSO-, 6762*

- DIMETHYLAMINOAZOBENZENE
  - SEE ANILINE, N,N-DIMETHYL-P-PHENYLAZO-

- DIMETHYLBENZANTHRACENE
  - SEE BENZ(A)ANTHRACENE, 7,12-DIMETHYL-

- DIPHENOL OXIDASES
  - MELANOMA
    - PIGMENTATION, REVIEW, 6935*

- DISGERMINOMA
  - ATAXIA TELANGIECTASIA
    - CASE REPORT, 7026*
  - OVARIAN NEOPLASMS
    - CHOLESTEROL, URINARY, 7003
  - TESTICULAR NEOPLASMS
    - CRYPTORCHISM, 7009
  - ULTRASTUCTURAL STUDY
    - CASE REPORT, 6977

- DISULFIDE, BIS(DIETHYLTHIOCARBAMOYL)-
  - BENZO(A)PYRENE
    - NUCLEIC ACIDS, BINDING, 6756*
  - STOMACH NEOPLASMS
    - BENZO(A)PYRENE, 6756*

- DIVERTICULOSIS
  - DIET
    - FIBERS, REVIEW, 6608
  - DIETARY FATS
    - EPIDEMIOLOGY, REVIEW, 6608

- DNA
  - ALKYLATING AGENTS
    - ALKALINE ELUTION ASSAY, 6713
  - BENZO(A)PYRENE , 6794 , 6796
    - BINDING, 6697
    - BINDING, COVALENT, 6695
    - BINDING DIOLEPOXIDES, 6698
    - DIOL EPOXIDES, 6695
  - BENZO(A)PYRENE, 6-TRITIO-
    - BENZO(A)PYRENE, 6-IODO-, 6702
    - BINDING, 6702
  - BREAST NEOPLASMS
    - CARCINOMA, 7020*
    - CELLS, CULTURED, 7162
  - CHROMOSOME ABERRATIONS
    - C-BANDING, PEROMYSCUS, 7056*
  - GUANIDINE, 1-METHYL-3-NITRO-1-NITROSO-
    - CARCINOGENIC POTENTIAL, 6713
  - GYNECOLOGIC NEOPLASMS
    - CELLS, CULTURED, 7162
  - HYDROGEN-ION CONCENTRATION
    - DEOXYRIBONUCLEASE, 6718
  - MELANOMA
    - CELLS, CULTURED, 7162
  - METHANESULFONIC ACID, ETHYL ESTER
    - CARCINOGENIC POTENTIAL, 6713

- METHANESULFONIC ACID, METHYL ESTER
    - CARCINOGENIC POTENTIAL, 6713
- POLYCYCLIC HYDROCARBONS
    - ALKALINE ELUTION ASSAY, 6713
    - CARCINOGENIC POTENTIAL, 6713
- PURINES
    - DEOXYRIBONUCLEASE, 6718
- PYRIMIDINES
    - EMBRYO, RAT, 7179
- RADIATION, IONIZING
    - SINGLE-STRAND BREAKS, 6811*
    - UREA, THIO-, 6811*
- SULFURIC ACID, DIMETHYL ESTER
    - DEOXYRIBONUCLEASE, 6718
- THYMIDINE
    - DEOXYRIBONUCLEASE, 7179
    - EMBRYO, RAT, 7179
- ULTRAVIOLET RAYS
    - PYRIMIDINE DIMERS, 6793
- UREA, ETHYL NITROSO-
    - CARCINOGENIC ACTIVITY, RAT, 6771*
    - CARCINOGENIC METABOLITE, 6771*
    - CARCINOGENIC POTENTIAL, 6713
- UREA, METHYL NITROSO-
    - CARCINOGENIC POTENTIAL, 6713
    - DEOXYRIBONUCLEASE, 6718
- URIDINE, 5-BROMO-2'-DEOXY-
    - DEOXYRIBONUCLEASE, 7179
    - EMBRYO, RAT, 7179
- VIRUS, RNA TUMOR
    - VIRUS-LIKE PARTICLES, 6900*
- VIRUS, SV40
    - CELL TRANSFORMATION, NEOPLASTIC, 6879*
    - REVERTANT CELL LINES, 6879*

DNA, CIRCULAR
- VIRUS, SV40
    - DNA REPLICATION, 6854
    - ENDONUCLEASES, 6854

DNA, NEOPLASM
- GLIOMA
    - DNA-RNA HYBRIDIZATION, 7174

DNA NUCLEOTIDYLTRANSFERASES
- CELL MEMBRANE
    - LIVER REGENERATION, 7185
- CYTOPLASM
    - LIVER REGENERATION, 7185
- SUBCELLULAR FRACTIONS
    - LIVER, RAT, 7185
- VIRUS, MURINE MAMMARY TUMOR
    - DNA REPLICATION, 6893*
    - ISOLATION AND CHARACTERIZATION, 6893*
    - PEPTIDES, 6893*

DNA POLYMERASE
- SEE ALSO DNA NUCLEOTIDYLTRANSFERASES
- HEPATOMA
    - DIETHYLAMINE, N-NITROSO-, 6765*
- LEUKEMIA, LYMPHOBLASTIC
    - MOLECULAR PROBES, 6622
- LEUKEMIA, MYELOBLASTIC
    - MOLECULAR PROBES, 6622
- ONCOGENIC VIRUSES
    - MOLECULAR PROBES, 6622
- VIRUS, AVIAN MYELOBLASTOSIS
    - BERYLLIUM, 6674

DNA REPAIR
- ACETAMIDE, N-(ACETYLOXY)-N-9H-FLUOREN-2-YL-
    - AMINO ACIDS, 6795
    - HISTONES, 6795
    - NUCLEOPROTEINS, 6795
- AGING
    - CELL TRANSFORMATION, NEOPLASTIC, REVIEW, 6634
- ANTI-INFLAMMATORY AGENTS
    - REVIEW, 6719
- EXONUCLEASES
    - PLACENTA, 7183
- ONCOGENIC VIRUSES
    - CELL TRANSFORMATION, NEOPLASTIC, REVIEW, 6634
- RADIATION, IONIZING
    - CELL TRANSFORMATION, NEOPLASTIC, REVIEW, 6634
    - RECOMBINATION, 7176
- ULTRAVIOLET RAYS
    - AMINO ACIDS, 6795
    - CELL TRANSFORMATION, NEOPLASTIC, REVIEW, 6634
    - HISTONES, 6795
    - NUCLEOPROTEINS, 6795
    - TRANSDUCTION, GENETIC, 6815*
- XERODERMA PIGMENTOSUM
    - COLONY FORMATION, 6796
    - COMPLEMENTATION GROUP, 6794, 6796
    - FIBROBLASTS, 6794
    - HYBRID CELLS, 6794
    - ULTRAVIOLET RAYS

DNA REPLICATION
- ANTI-INFLAMMATORY AGENTS
    - REVIEW, 6719
- AUTOIMMUNE DISEASES
    - MACROGLOBULINEMIA, 6946*
- BENZ(A)ANTHRACENE, 7,12-DIMETHYL-
    - ESTRADIOL, 6682
    - INSULIN, 6682
    - PROGESTERONE, 6682
    - PROLACTIN, 6682
- BENZO(A)PYRENE
    - BENZ(A)ANTHRACENE, 7,12-DIMETHYL-, 6751*
    - FIBROBLASTS, REVIEW, 6646*
    - LYMPHOCYTES, 6751*
- BRAIN NEOPLASMS
    - GLIOMA, 7126*
- CALCIUM
    - CELL TRANSFORMATION, NEOPLASTIC, 7160
- CELL TRANSFORMATION, NEOPLASTIC
    - VIRUS, SV40, 6880*
- CEREBELLAR NEOPLASMS
    - GLIOMA, 7126*
- CHOLANTHRENE, 3-METHYL-
    - EPIDERMIS, MOUSE, 6761*
- CYSTEINE
    - RADIATION, IONIZING, 6776*
- DEXAMETHASONE
    - FIBROBLASTS, REVIEW, 6646*

FIBROBLASTS
  CELL CYCLE KINETICS, REVIEW, 6655*
FIBROSARCOMA
  CALCIUM, 7160
  CELLS, CULTURED, 7160
HELA CELLS
  CELL CYCLE KINETICS, REVIEW, 6655*
HEMANGIOENDOTHELIOMA
  CALCIUM, 7160
  CELLS, CULTURED, 7160
INSULIN
  FIBROBLASTS, REVIEW, 6646*
LEUKEMIA
  VIRUS, AVIAN MYELOBLASTOSIS, 6828
LEUKEMIA, MYELOBLASTIC
  OXYMETHOLONE, 7178
  PRECANCEROUS CONDITIONS, 6994
LEUKEMIA, MYELOCYTIC
  OXYMETHOLONE, 7178
LIPOPOLYSACCHARIDES
  ESCHERICHIA COLI, 7175
MAMMARY NEOPLASMS, EXPERIMENTAL
  BENZ(A)ANTHRACENE, 7,12-DIMETHYL-, 6682
MESENTERY
  CELL PROLIFERATION, TISSUE MODEL, 7156
METHYLGLYOXAL BIS(GUANYLHYDRAZONE) DIACETATE
  FIBROBLASTS, 7177
PACTAMYCIN
  IMMUNITY, CELLULAR, 6947*
  T-LYMPHOCYTES, 6947*
POLYAMINES
  FIBROBLASTS, 7177
QUINOLINE, 4-NITRO-, 1-OXIDE
  RADIATION, IONIZING, 6776*
RHABDOMYOSARCOMA
  CALCIUM, 7161
  NICKEL SULFIDE, 7161
SOMATOTROPIN
  FIBROBLASTS, REVIEW, 6646*
SPERMIDINE
  METHYLGLYOXAL BIS(GUANYLHYDRAZONE) DIACETATE, 7177
SPERMINE
  METHYLGLYOXAL BIS(GUANYLHYDRAZONE) DIACETATE, 7177
ULTRAVIOLET RAYS
  ACETOPHENONE, 6815*
  COLIPHAGES, 6815*
  ESCHERICHIA COLI, 6815*
VIRUS, AVIAN MYELOBLASTOSIS
  BERYLLIUM, 6674
  CATIONS, DIVALENT, 6829
  MAGNESIUM, 6829
  MANGANESE, 6829
  POTASSIUM CHLORIDE, 6829
  REVERSE TRANSCRIPTASE, 6829
VIRUS, HERPES SIMPLEX 1
  DNA, VIRAL, 6871
VIRUS, HERPES SIMPLEX 2
  DNA, VIRAL, 6912*
  DOSE-RESPONSE STUDY, 6912*
VIRUS, MURINE MAMMARY TUMOR
  DNA NUCLEOTIDYLTRANSFERASES, 6893*
VIRUS, POLYOMA
  HISTONES, 6862
  NUCLEOPROTEINS, 6862
  RNA POLYMERASE, 6862
VIRUS, ROUS SARCOMA
  NEURORETINAL CELLS, 6831
VIRUS, SV40
  CELL TRANSFORMATION, NEOPLASTIC, 6855, 6881*
  DELETION MUTANTS, 6854
  DNA, CIRCULAR, 6854
  FIBROBLASTS, REVIEW, 6646*

DNA, SINGLE STRANDED
  DIMETHYLAMINE, N-NITROSO-
    LIVER, RAT, 6714

DNA, VIRAL
  LEUKEMIA
    VIRUS, AVIAN MYELOBLASTOSIS, 6828
  VIRUS, AVIAN MYELOBLASTOSIS
    DNA-RNA HYBRIDIZATION, 6828
  VIRUS, EPSTEIN-BARR
    DNA-RNA HYBRIDIZATION, 6907*
    MOLECULAR PROBES, 6622
    PHOSPHONIC ACIDS, 6866
  VIRUS, FRIEND MURINE LEUKEMIA
    HOST RESTRICTION, 6835
  VIRUS, HERPES SAIMIRI
    ENDONUCLEASES, 6869
    ISOLATION AND CHARACTERIZATION, 6869
    ULTRASTRUCTURAL STUDY, 6869
  VIRUS, HERPES SIMPLEX 1
    DNA REPLICATION, 6871
    SEQUENCE HOMOLOGY, 6909*
    ULTRASTRUCTURAL STUDY, 6909*
  VIRUS, HERPES SIMPLEX 2
    DNA REPLICATION, 6912*
  VIRUS, STUMPTAILED MACAQUE
    ISOLATION AND CHARACTERIZATION, 6860
  VIRUS, SV40
    CELL TRANSFORMATION, NEOPLASTIC, 6851
    DELETION MUTANTS, 6854
    ISOLATION AND CHARACTERIZATION, 6856
    VIRUS REPLICATION, 6856

DRUG THERAPY
  LEUKEMIA
    PRECANCEROUS CONDITIONS, 6613
  LEUKEMIA, MYELOBLASTIC
    CELL AGGREGATION, 7197*
    CELL DIFFERENTIATION, 7197*

DUODENAL NEOPLASMS
  ADENOCARCINOMA
    GUANIDINE, 1-ETHYL-3-NITRO-1-NITROSO-, 7093*
    HYDRAZINE, 1,2-DIMETHYL-, 7092*
    ULTRASTRUCTURAL STUDY, 7092*
  GUANIDINE, 1-ETHYL-3-NITRO-1-NITROSO-
    ACID PHOSPHATASE, 7093*
    ADENOSINE TRIPHOSPHATASE, 7093*
    ALKALINE PHOSPHATASE, 7093*
    GLUCOSEPHOSPHATE DEHYDROGENASE, 7093*
    LACTATE DEHYDROGENASE, 7093*
    LEUCINE AMINOPEPTIDASE, 7093*
    PRECANCEROUS CONDITIONS, 7093*

- HYDRAZINE, 1,2-DIMETHYL-
  - ADENOCARCINOMA, 6739*
  - CARCINOMA, 6739*
  - POLYPS, 6739*
  - ULTRASTRUCTURAL STUDY, 6739*, 7092*
- ISLET CELL TUMOR
  - CASE REPORT, 7089*
  - GASTRIN, 7089*
- POLYPS
  - HYDRAZINE, 1,2-DIMETHYL-, 7092*
  - ULTRASTRUCTURAL STUDY, 7092*
- ZOLLINGER-ELLISON SYNDROME
  - CASE REPORT, 7089*
  - GASTRIN, 7089*

DUPUYTREN'S CONTRACTURE
- BLOOD VESSELS
  - ULTRASTRUCTURAL STUDY, 7090*
- SKIN NEOPLASMS
  - ULTRASTRUCTURAL STUDY, 7090*

DUST
- BENZ(A)ANTHRACENE, 7,12-DIMETHYL-
  - CARCINOGENIC POTENTIAL, 6751*
- BENZO(A)PYRENE
  - CARCINOGENIC POTENTIAL, 6751*
- NOSE NEOPLASMS
  - WOOD, 7115

EHRLICH ASCITES CARCINOMA
- SEE CARCINOMA, EHRLICH TUMOR

ENDOMETRIAL HYPERPLASIA
- ADENOCARCINOMA
  - CARBOHYDRATES, 7188
  - ENZYMES, 7188
  - GLUCOSEPHOSPHATE DEHYDROGENASE, 7188

ENDOMETRIOSIS
- OVARIAN NEOPLASMS
  - CHOLESTEROL, URINARY, 7003
  - MUCOPOLYSACCHARIDES, 7025*
  - NEOPLASMS, MULTIPLE PRIMARY, 6968

ENDOMETRIUM
- ADENOCARCINOMA
  - CARBOHYDRATES, 7188
  - ENZYMES, 7188
  - GLUCOSEPHOSPHATE DEHYDROGENASE, 7188

ENDONUCLEASES
- ULTRAVIOLET RAYS
  - FIBROBLASTS, 6793
- VIRUS, HERPES SAIMIRI
  - DNA, VIRAL, 6869
- VIRUS, POLYOMA
  - RNA, MESSENGER, 6861
- VIRUS, SV40
  - DNA, CIRCULAR, 6854
- XERODERMA PIGMENTOSUM
  - ULTRAVIOLET RAYS, 6793

ENTERITIS, REGIONAL
- COLONIC NEOPLASMS
  - PRECANCEROUS CONDITIONS, 7108
- INTESTINAL NEOPLASMS
  - EPIDEMIOLOGY, 6614
  - REVIEW, 6614

ENVIRONMENTAL HAZARD
- CARCINOGEN, CHEMICAL
  - RISK EVALUATION PROGRAM, 6601
- DIMETHYLAMINE, N-NITROSO-
  - AIR POLLUTANTS, 6712
- ETHYLENE, CHLORO- POLYMER
  - EPIDEMIOLOGY, 6735*
- LEUKEMIA
  - ETHYLENE, CHLORO- POLYMER, 6735*
- LYMPHOMA
  - ETHYLENE, CHLORO- POLYMER, 6735*
- MESOTHELIOMA
  - ASBESTOS, 7139*
- NERVOUS SYSTEM NEOPLASMS
  - ETHYLENE, CHLORO- POLYMER, 6735*
- RADIATION, IONIZING
  - ABSORBED DOSE RATE, 6801

ENZYMES
- LEUKEMIA, HAIRY CELL
  - ACID PHOSPHATASE, 6997
  - CASE REPORT, 6997

ERYTHEMA
- GENETICS
  - CHROMATID EXCHANGES, 7057*

ERYTHROCYTES
- ANEMIA, APLASTIC
  - MICROTUBULES, 6961
  - MITOCHONDRIA, 6961
  - ULTRASTRUCTURAL STUDY, 6961
- L CELLS
  - AGGLUTINATION, 6955*
- LEUKEMIA, MYELOCYTIC
  - MITOCHONDRIA, 6961
  - ULTRASTRUCTURAL STUDY, 6961
- VIRUS, RAUSCHER MURINE LEUKEMIA
  - AGGLUTINATION, 6846
  - ANTIGENS, VIRAL, 6845
  - CELL MEMBRANE, 6846
  - CONCANAVALIN A, 6846
  - PLANT AGGLUTININS, 6846
  - VIRUS REPLICATION, 6846

ERYTHROLEUKEMIA
- VIRUS, FRIEND MURINE LEUKEMIA
  - PENTOSEPHOSPHATES, 6836
  - PURINES, 6836

ERYTHROPLASIA
- LYMPHOCYTOSIS
  - CASE REPORT, 7076*

ERYTHROPOIESIS
- ANEMIA, APLASTIC
  - REVIEW, 6623
- LEUKEMIA, MYELOBLASTIC
  - PRECANCEROUS CONDITIONS, 6994
  - REVIEW, 6623
- VIRUS, FRIEND MURINE LEUKEMIA
  - ACRIDINE, 3,6-DIAMINO-, 6837
  - CELL CYCLE KINETICS, 6837
  - INTERFERON, 6886*
  - METHANE, SULFINYLBIS-, 6837
  - THYMIDINE, 6837

- VIRUS, RAUSCHER MURINE LEUKEMIA
  - FREUND'S ADJUVANT, 6889*
  - IRON INCORPORATION, 6844
  - SPLEEN, 6844

ERYTHROPOIETIN
- VIRUS, RAUSCHER MURINE LEUKEMIA
  - DOSE-RESPONSE STUDY, 6844

ESCHERICHIA COLI
- LIPOPOLYSACCHARIDES
  - DNA REPLICATION, 7175
- ULTRAVIOLET RAYS
  - DNA REPLICATION, 6815*
  - TRANSDUCTION, GENETIC, 6815*

ESOPHAGEAL NEOPLASMS
- CARCINOMA IN SITU
  - EPIDEMIOLOGY, JAPAN, 7131*
  - HISTOLOGICAL STUDY, 7131*
- CHONDROSARCOMA
  - CASE REPORT, 7036*
- HISTIOCYTOMA
  - HERBS, 6743*
  - TANNINS, 6743*
  - TEA, 6743*
- PRECANCEROUS CONDITIONS
  - EPIDEMIOLOGY, JAPAN, 7131*
  - HISTOLOGICAL STUDY, 7131*

ESTRADIOL
- BENZ(A)ANTHRACENE, 7,12-DIMETHYL-
  - DNA REPLICATION, 6682
- BENZO(A)PYRENE
  - HYDROXYLASES, 6749*
- CARCINOMA, BRONCHOGENIC
  - CELLS, CULTURED, 7192
- CELL TRANSFORMATION, NEOPLASTIC
  - METABOLISM, AGE FACTORS, 6787*
- CHORIOCARCINOMA
  - CELLS, CULTURED, 7192
- ESTRADIOL, 17ALPHA-ETHYNYL-
  - SERUM LEVELS, 6788*
- HEART NEOPLASMS
  - MOUSE, 6775*
  - NEOPLASM METASTASIS, 6775*
- LEUKEMIA, MYELOCYTIC
  - CELL DIFFERENTIATION, 6950*
- MAMMARY NEOPLASMS, EXPERIMENTAL
  - BENZ(A)ANTHRACENE, 7,12-DIMETHYL-, 6682, 6783*
  - RECEPTORS, HORMONE, 6783*
- NORGESTREL
  - SERUM LEVELS, 6788*
- SERUM LEVELS
  - UTERINE RECEPTORS, 6721
- UTERINE NEOPLASMS
  - ADENOCARCINOMA, 6786*
  - BODY WEIGHT, 6786*
  - MENOPAUSE, 6786*
  - REVIEW, 6605
  - SERUM LEVELS, 6786*
- VIRAL PROTEINS
  - UTERUS, MOUSE, 6898*

ESTRADIOL, 17ALPHA-ETHYNYL-
- ESTRADIOL
  - SERUM LEVELS, 6788*
- FSH
  - SERUM LEVELS, 6788*
- LH
  - SERUM LEVELS, 6788*
- PROGESTERONE
  - SERUM LEVELS, 6788*

ESTRIOL
- UTERINE NEOPLASMS
  - REVIEW, 6605

ESTROGENS
- BREAST NEOPLASMS
  - UTERINE NEOPLASMS, 6790*
- GYNECOLOGIC DISEASES
  - DRUG THERAPY, REVIEW, 6604
- MESTRANOL
  - UTERUS, MOUSE, 6898*
- REVERSE TRANSCRIPTASE
  - UTERUS, MOUSE, 6898*
- RNA
  - VIRUS, AVIAN MYELOBLASTOSIS, 6720
- UTERINE NEOPLASMS
  - EPIDEMIOLOGY, REVIEW, 6604
  - PRECANCEROUS CONDITIONS, 6790*
  - REVIEW, 6605
- UTERINE RECEPTORS
  - BINDING, 6716
- VIRUS, C-TYPE RNA TUMOR
  - VIRUS REPLICATION, 6898*

ESTRONE
- CELL TRANSFORMATION, NEOPLASTIC
  - METABOLISM, AGE FACTORS, 6787*
- UTERINE NEOPLASMS
  - ADENOCARCINOMA, 6786*
  - BODY WEIGHT, 6786*
  - MENOPAUSE, 6786*
  - REVIEW, 6605
  - SERUM LEVELS, 6786*

ESTRONE SULFATE
- UTERINE NEOPLASMS
  - REVIEW, 6605

ETHANE, 1,1,1-TRICHLORO-
- AIR POLLUTANTS
  - CHROMATOGRAPHIC ANALYSIS, 6737*

ETHANE, 1,1,1-TRICHLORO-2,2-BIS(P-CHLOROPHENYL)-
- VIRAL PROTEINS
  - UTERUS, MOUSE, 6898*

ETHANEDIOIC ACID, DISODIUM SALT
- LEUKEMIA, LYMPHOCYTIC
  - RADIAL SEGMENTATION, 7081*

ETHANOL, 2-MERCAPTO-
- B-LYMPHOCYTES
  - FETUS, MOUSE, 6949*
- VIRUS, ABELSON MURINE LEUKEMIA
  - CELL TRANSFORMATION, NEOPLASTIC, 6884*

ETHER, BIS(CHLOROMETHYL)-
- WATER POLLUTANTS
  - ISOLATION AND CHARACTERIZATION, 7150*

- ETHIDIUM BROMIDE
  - CARCINOMA, EHRLICH TUMOR
    - RNA, NEOPLASM, 7173
  - VIRUS, MOLONEY MURINE LEUKEMIA
    - RNA, VIRAL, 6849

- ETHYL ALCOHOL
  - LIVER CIRRHOSIS
    - PROLACTIN, 6642*

- ETHYLENE, CHLORO-
  - LIVER NEOPLASMS
    - ANGIOSARCOMA, 6736*
    - CASE REPORT, 6736*
  - OCCUPATIONAL HAZARD
    - CHROMOSOME ABERRATIONS, 6671

- ETHYLENE, CHLORO- POLYMER
  - ANENCEPHALUS
    - EPIDEMIOLOGY, 6735*
  - ENVIRONMENTAL HAZARD
    - EPIDEMIOLOGY, 6735*
  - HYDROCEPHALUS
    - EPIDEMIOLOGY, 6735*
  - LEUKEMIA
    - ENVIRONMENTAL HAZARD, 6735*
  - LYMPHOMA
    - ENVIRONMENTAL HAZARD, 6735*
  - MALFORMATION, CONGENITAL
    - EPIDEMIOLOGY, 6735*
  - NERVOUS SYSTEM NEOPLASMS
    - ENVIRONMENTAL HAZARD, 6735*
  - SPINA BIFIDA
    - EPIDEMIOLOGY, 6735*

- ETHYLENE, TETRACHLORO-
  - AIR POLLUTANTS
    - CHROMATOGRAPHIC ANALYSIS, 6737*

- ETHYLENE, TRICHLORO-
  - AIR POLLUTANTS
    - CHROMATOGRAPHIC ANALYSIS, 6737*

- ETHYLENE, 1,1,2-TRICHLORO-1,2,2-TRIFLUORO-
  - AIR POLLUTANTS
    - CHROMATOGRAPHIC ANALYSIS, 6737*

- EXONUCLEASES
  - PLACENTA
    - DNA REPAIR, 7183
    - ISOLATION AND CHARACTERIZATION, 7183

- EYE NEOPLASMS
  - ACETAMIDE, N,N'-9H-FLUORENE-2,7-DIYLBIS-
    - DOSE-RESPONSE STUDY, MOUSE, 6676
  - ANGIOMATOSIS
    - CASE REPORT, 7014, 7054*
    - ULTRASTRUCTURAL STUDY, 7054*
  - BRAIN NEOPLASMS
    - ANGIOMATOSIS, 7014
  - HEMANGIOMA
    - CASE REPORT, 6981
    - ULTRASTRUCTURAL STUDY, 6981
  - LEIOMYOMA
    - CASE REPORT, 6981
    - ULTRASTRUCTURAL STUDY, 6981

- FALLOPIAN TUBE NEOPLASMS
  - CARCINOMA, TRANSITIONAL CELL
    - CASE REPORT, 6968
    - NEOPLASMS, MULTIPLE PRIMARY, 6968
  - NEOPLASMS, MULTIPLE PRIMARY
    - CASE REPORT, 6968

- FETAL GLOBULINS
  - HEPATOMA
    - AFLATOXIN B1, 6725*
    - REVIEW, 6611

- FETAL HEMOGLOBIN
  - ANEMIA, HEMOLYTIC
    - SERUM LEVELS, 7164
  - ANEMIA, PERNICIOUS
    - SERUM LEVELS, 7164
  - LEUKEMIA
    - SERUM LEVELS, 7164
  - LYMPHOMA
    - SERUM LEVELS, 7164
  - POLYCYTHEMIA
    - SERUM LEVELS, 7164

- FIBERS
  - ASBESTOS
    - CARCINOGENIC EFFECT, 6827*

- FIBRINOLYSIS
  - BLEOMYCIN
    - CELL TRANSFORMATION, NEOPLASTIC, 6758*
  - CHOLANTHRENE, 3-METHYL-
    - CELL TRANSFORMATION, NEOPLASTIC, 6758*
  - SMOKING
    - CELL TRANSFORMATION, NEOPLASTIC, 6758*
  - URIDINE, 2'-DEOXY-5-FLUORO-
    - CELL TRANSFORMATION, NEOPLASTIC, 6758*

- FIBROBLASTS
  - ACTINOMYCIN D
    - RIBOSOMAL PROTEINS, 7166
  - AGING
    - MITOSIS, 6855
  - CELL DIVISION
    - CELL CYCLE KINETICS, REVIEW, 6655*
  - DNA REPLICATION
    - CELL CYCLE KINETICS, REVIEW, 6655*
  - GROWTH SUBSTANCES
    - RIBOSOMAL PROTEINS, 7166
  - HYPERCHOLESTEREMIA
    - CHOLESTEROL, 6911*
    - LIPOPROTEINS, 6911*
    - OXIDOREDUCTASES, 6911*
  - KININS
    - CARBOXYPEPTIDASES, 7180
  - METHANESULFONIC ACID, ETHYL ESTER
    - RNA POLYMERASE, 6667
  - METHYLGLYOXAL BIS(GUANYLHYDRAZONE) DIACETATE
    - DNA REPLICATION, 7177
  - PEPTIDE ELONGATION FACTORS
    - RIBOSOMAL PROTEINS, 7166
  - POLYAMINES
    - DNA REPLICATION, 7177
  - RIBOSOMAL PROTEINS

    LEUCINE INCORPORATION, 7166
  RNA POLYMERASE
    ALPHA-AMANITIN RESISTANCE, 6667
  RNA REPLICATION
    RIBOSOMAL PROTEINS, 7166
  ULTRAVIOLET RAYS
    ENDONUCLEASES, 6793
    PYRIMIDINE DIMERS, 6793
  UREA, METHYL NITROSO-
    CELL CYCLE KINETICS, 6773*
    MUTAGENIC EFFECT, 6773*
  VIRUS, AVIAN ERYTHROBLASTIC LEUKOSIS
    CELL TRANSFORMATION, NEOPLASTIC, 6830
  XERODERMA PIGMENTOSUM
    DNA REPAIR, 6794

FIBROMA
  BRAIN NEOPLASMS
    CASE REPORT, 7051*
  HEART NEOPLASMS
    CASE REPORT, CHILD, 6991
    ULTRASTRUCTURAL STUDY, 6991

FIBROSARCOMA
  BONE NEOPLASMS
    WOUNDS AND INJURIES, 6803
  CALCIUM
    DNA REPLICATION, 7160
  CELLS, CULTURED
    DNA REPLICATION, 7160
  CHOLANTHRENE, 3-METHYL-
    COLLAGENOLYTIC ACTIVITY, 6759*
    ISOANTIBODIES, 6924
    TRANSPLANTATION IMMUNOLOGY, 6924
  HEART NEOPLASMS
    MOUSE, 6775*
  HISTOCOMPATIBILITY ANTIGENS
    ANTIBODY DISSOCIATION, 6924
    ANTIGEN-ANTIBODY COMPLEX, 6924
  NEOPLASM TRANSPLANTATION
    ANTIBODY DISSOCIATION, 6924
  ODONTOGENIC TUMOR
    CASE REPORT, 7040*
  OVARIAN NEOPLASMS
    CASE REPORT, 7027*
  RNA
    IMMUNITY, CELLULAR, 6932
  SARCOMA
    MIGRATION INHIBITORY FACTOR, 6918
  VIRUS, AVIAN ERYTHROBLASTIC LEUKOSIS
    VIRUS, HELPER, 6830

FIBROUS DYSPLASIA, POLYOSTOTIC
  BONE NEOPLASMS
    CASE REPORT, 7039*
    SARCOMA, OSTEOGENIC, 7039*

FLUORENYL ACETAMIDE
  SEE ACETAMIDE, N-FLUOREN-2-YL-

FOOD CONTAMINATION
  BENZO(A)PYRENE
    FISH, 6700
  LIVER NEOPLASMS
    AFLATOXIN B1, 6668
  MYCOTOXINS
    PROTEIN CONCENTRATES, 6666

FOREIGN BODIES
  GRANULOMA
    HYPERSENSITIVITY, DELAYED, 6651*

FORMAMIDE, N-(4-(5-NITRO-2-FURYL)-2-THIAZOLYL)-
  BLADDER NEOPLASMS
    CARCINOGENIC ACTIVITY, RAT, 6683
    MITOMYCIN C, 6683

FREUND'S ADJUVANT
  VIRUS, RAUSCHER MURINE LEUKEMIA
    CELL TRANSFORMATION, NEOPLASTIC, 6889*
    ERYTHROPOIESIS, 6889*

FRUCTOSEDIPHOSPHATE ALDOLASE
  HEPATOMA
    RNA, MESSENGER, 7181

FSH
  ESTRADIOL, 17ALPHA-ETHYNYL-
    SERUM LEVELS, 6788*
  NORGESTREL
    SERUM LEVELS, 6788*

FUCOSE
  VIRUS, RAUSCHER MURINE LEUKEMIA
    GLYCOPROTEINS, 6890*

GALLBLADDER NEOPLASMS
  CARCINOMA, MUCINOUS
    HISTOCHEMICAL STUDY, 7072*
    ULTRASTRUCTURAL STUDY, 7072*
  EPIDEMIOLOGY
    REVIEW, 6611
  METAPLASIA
    HISTOCHEMICAL STUDY, 7072*
    ULTRASTRUCTURAL STUDY, 7072*

GANGLIONEUROMA
  GENETICS
    CASE REPORT, 7053*

GASTRECTOMY
  NITROGEN
    METABOLISM, REVIEW, 6653*

GASTRIC MUCOSA
  EROSIONS
    ENDOSCOPIC STUDY, 7018
  HYPERPLASIA
    ENDOSCOPIC STUDY, 7018

GASTRIN
  DUODENAL NEOPLASMS
    ISLET CELL TUMOR, 7089*
    ZOLLINGER-ELLISON SYNDROME, 7089*
  PANCREATIC NEOPLASMS
    ISLET CELL TUMOR, 7089*
    ZOLLINGER-ELLISON SYNDROME, 7089*

GASTROINTESTINAL NEOPLASMS
  AFLATOXIN B1
    CASE REPORT, 6668
  AIR POLLUTANTS
    EPIDEMIOLOGY, 7147*
  ASBESTOS
    EPIDEMIOLOGY, 6670, 7121, 7149*

- DIET
  - EPIDEMIOLOGY, REVIEW, 6656*
- HYPERPLASIA
  - ENDOSCOPIC STUDY, 7018
- LEAD
  - AIR POLLUTION, 7147*
- B-LYMPHOCYTES
  - NEOPLASM METASTASIS, 6930
- T-LYMPHOCYTES
  - NEOPLASM METASTASIS, 6930
- OCCUPATIONAL HAZARD
  - COKE-OVENS, 7122
  - EPIDEMIOLOGY, 6670, 7122, 7123
- SCLERODERMA, SYSTEMIC
  - EPIDEMIOLOGY, REVIEW, 6625
- WATER POLLUTANTS
  - ASBESTOS, 7149*
  - EPIDEMIOLOGY, 7149*

GASTROINTESTINAL SYSTEM
- BACTERIA
  - DIETARY FIBER, REVIEW, 6607
- BILE ACIDS AND SALTS
  - DIETARY FIBER, REVIEW, 6607
- TRYPTOPHAN
  - CARCINOGENIC METABOLITE, 6722*

GENETICS
- BRAIN NEOPLASMS
  - ASTROCYTOMA, 7013
  - CASE REPORT, 7013
  - GLIOBLASTOMA MULTIFORME, 7013
- BREAST NEOPLASMS
  - EPIDEMIOLOGY, REVIEW, 6624
- CELL DIFFERENTIATION
  - REVIEW, 6640
- COLONIC NEOPLASMS
  - EPIDEMIOLOGY, REVIEW, 6612
- ERYTHEMA
  - CHROMATID EXCHANGES, 7057*
- GANGLIONEUROMA
  - CASE REPORT, 7053*
- MAMMARY NEOPLASMS, EXPERIMENTAL
  - RADIATION, IONIZING, 6809*
- NEUROBLASTOMA
  - CASE REPORT, 7053*
- PANCREATIC NEOPLASMS
  - CARCINOMA, 7074*
  - CASE REPORT, 7074*
- RECTAL NEOPLASMS
  - EPIDEMIOLOGY, REVIEW, 6612
- RETINOBLASTOMA
  - CHROMOSOME ABERRATIONS, REVIEW, 6983
  - CHROMOSOMES, 7055*
  - HISTOLOGICAL STUDY, 6982
  - MITOCHONDRIA, 6982
- THYROID NEOPLASMS
  - DIAGNOSIS AND TREATMENT, REVIEW, 6639

GERM CELLS
- RADIATION, IONIZING
  - RADIATION GENETICS, REVIEW, 6643*

GIANT CELL TUMORS
- BONE NEOPLASMS
  - CASE REPORT, 7038*
  - ULTRASTRUCTURAL STUDY, 7038*
- ULTRASTRUCTURAL STUDY
  - CASE REPORT, 7067*

GLIOBLASTOMA MULTIFORME
- BRAIN NEOPLASMS
  - ASTROCYTOMA, 7013
  - CASE REPORT, 7013, 7050*
  - GENETICS, 7013
  - OLIGODENDROGLIOMA, 7050*
  - WOUNDS AND INJURIES, 7050*

GLIOMA
- BRAIN NEOPLASMS
  - DNA REPLICATION, 7126*
  - EPIDEMIOLOGY, SOUTHWEST ASIA, 7130*
- CEREBELLAR NEOPLASMS
  - DNA REPLICATION, 7126*
- DNA, NEOPLASM
  - DNA-RNA HYBRIDIZATION, 7174
- GLUCURONIDASE
  - ENZYMATIC ACTIVITY, 7186
- NERVOUS SYSTEM NEOPLASMS
  - INCIDENCE RATES, MOUSE, 7145*
- RADIATION, IONIZING
  - EPIDEMIOLOGY, CHILD, 6825*

GLUCOSAMINE
- VIRUS, RAUSCHER MURINE LEUKEMIA
  - GLYCOPROTEINS, 6890*

GLUCOSE
- HEPATOMA
  - ENZYMATIC ACTIVITY, REVIEW, 6631
- ISLET CELL TUMOR
  - INSULIN, 6726*

GLUCOSE, 2-AMINO-2-DEOXY-
- VIRUS, B77
  - VIRAL PROTEINS, 6833
  - VIRUS REPLICATION, 6833
- VIRUS, ROUS SARCOMA
  - VIRAL PROTEINS, 6833
  - VIRUS REPLICATION, 6833

GLUCOSEPHOSPHATE DEHYDROGENASE
- ADENOCARCINOMA
  - ENDOMETRIAL HYPERPLASIA, 7188
- DUODENAL NEOPLASMS
  - GUANIDINE, 1-ETHYL-3-NITRO-1-NITROSO-, 7093*
- ENDOMETRIUM
  - ADENOCARCINOMA, 7188
- LEUKEMIA
  - CELL DIFFERENTIATION, REVIEW, 6616
- MELANOMA
  - CELL LINE, 7194*

GLUCURONIC ACID
- ACETAMIDE, N-FLUOREN-2-YL-
  - ACETANILIDE, 4'-HYDROXY-, 6730*
- ACETOHYDROXAMIC ACID, N-FLUOREN-2-YL-
  - ACETANILIDE, 4'-HYDROXY-, 6730*

GLUCURONIDASE
- GLIOMA
  - ENZYMATIC ACTIVITY, 7186

- GLUTAMINE
  - VIRUS, FRIEND MURINE LEUKEMIA
    - PURINES, 6836

- GLUTAMYL TRANSPEPTIDASE
  - COLONIC NEOPLASMS
    - DIAGNOSIS AND PROGNOSIS, 7082*
  - LIVER NEOPLASMS
    - NEOPLASM METASTASIS, 7082*

- GLUTATHIONE
  - AFLATOXIN B1
    - NORGESTREL, 6669
  - BENZO(A)PYRENE
    - HYDROXYLASES, 6749*

- GLYCOGEN
  - KIDNEY NEOPLASMS
    - VIRUS, LEOPARD FROG CARCINOMA, 7196*

- GLYCOLIPIDS
  - VIRUS, SV40
    - TEMPERATURE SENSITIVE MUTANTS, 6882*

- GLYCOPEPTIDES
  - VIRUS, SV40
    - TEMPERATURE SENSITIVE MUTANTS,6882*

- GLYCOPROTEINS
  - BLEOMYCIN
    - CELL TRANSFORMATION, NEOPLASTIC, 6758*
  - CHOLANTHRENE, 3-METHYL-
    - CELL TRANSFORMATION, NEOPLASTIC, 6758*
  - SMOKING
    - CELL TRANSFORMATION, NEOPLASTIC, 6758*
  - URIDINE, 2'-DEOXY-5-FLUORO-
    - CELL TRANSFORMATION, NEOPLASTIC, 6758*
  - VIRUS, POLYOMA
    - CELL TRANSFORMATION, NEOPLASTIC, 6864
    - HYALURONIDASE, 6864
  - VIRUS, RAUSCHER MURINE LEUKEMIA
    - FUCOSE, 6890*
    - GLUCOSAMINE, 6890*
    - METHIONINE, 6890*
  - VIRUS, ROUS SARCOMA
    - CELL TRANSFORMATION, NEOPLASTIC, 6864
    - HYALURONIDASE, 6864

- GLYCOSAMINOGLYCANS
  - CHONDROSARCOMA
    - CASE REPORT, 7165

- GOITER, NODULAR
  - NECK NEOPLASMS
    - CASE REPORT, 7044*

- GONADOTROPINS, CHORIONIC
  - CARCINOMA, BRONCHOGENIC
    - CELLS, CULTURED, 7192
  - CHORIOCARCINOMA
    - CELLS, CULTURED, 7192

- GRAFT REJECTION
  - RADIATION, IONIZING
    - MUTATION, 6823*

- GRAFT VS HOST REACTION
  - LEUKEMIA, LYMPHOCYTIC
    - CORTISONE, 6929
    - HISTOCOMPATIBILITY ANTIGENS, 6929
  - T-LYMPHOCYTES
    - ANTIBODY FORMATION, 6942*
  - RADIATION, IONIZING
    - ISOANTIGENS, 6942*

- GRANULOMA
  - BREAST NEOPLASMS
    - PRECANCEROUS CONDITIONS, 7136*
  - FOREIGN BODIES
    - HYPERSENSITIVITY, DELAYED, 6651*
  - HODGKIN'S DISEASE
    - ULTRASTRUCTURAL STUDY, 7083*
  - HYPERSENSITIVITY, DELAYED
    - IMMUNE RESPONSE, REVIEW, 6651*
  - MACROPHAGES
    - CELL DIFFERENTIATION, REVIEW, 6651*
  - MYCOBACTERIUM TUBERCULOSIS
    - HYPERSENSITIVITY, DELAYED, 6651*
  - PHAGOCYTES
    - CELL DIFFERENTIATION, REVIEW, 6651*
  - ULTRASTRUCTURAL STUDY
    - CASE REPORT, 7067*

- GRANULOSA CELL TUMOR
  - OVARIAN NEOPLASMS
    - CHOLESTEROL, URINARY, 7003

- GROWTH SUBSTANCES
  - FIBROBLASTS
    - RIBOSOMAL PROTEINS, 7166
  - MELANOMA
    - BLOOD VESSELS, 7155
  - NEOPLASMS, EXPERIMENTAL
    - ISOLATION AND CHARACTERIZATION, REVIEW, 6635
  - PHOSPHATES
    - METABOLISM, 3T3 CELLS, 7198*

- GUANIDINE, 1-ETHYL-3-NITRO-1-NITROSO-
  - DUODENAL NEOPLASMS
    - ACID PHOSPHATASE, 7093*
    - ADENOCARCINOMA, 7093*
    - ADENOSINE TRIPHOSPHATASE, 7093*
    - ALKALINE PHOSPHATASE, 7093*
    - GLUCOSEPHOSPHATE DEHYDROGENASE, 7093*
    - LACTATE DEHYDROGENASE, 7093*
    - LEUCINE AMINOPEPTIDASE, 7093*
    - PRECANCEROUS CONDITIONS, 7093*

- GUANIDINE, 1-METHYL-3-NITRO-1-NITROSO-
  - DNA
    - CARCINOGENIC POTENTIAL, 6713
  - MUTAGENIC ACTIVITY
    - CELLS, CULTURED, HAMSTER, 6778*
  - SARCOMA
    - ASPARAGINE REQUIREMENT, MUTATION, 6715

- GUANINE
  - DIMETHYLAMINE, N-NITROSO-
    - NUCLEIC ACIDS, 6710

- GYNECOLOGIC DISEASES
  - ESTROGENS
    - DRUG THERAPY, REVIEW, 6604

- GYNECOLOGIC NEOPLASMS
  - AIR POLLUTANTS
    - EPIDEMIOLOGY, 7147*
  - CELLS, CULTURED
    - DNA, 7162
    - KARYOTYPING, 7162
    - MEIOSIS, 7162
  - LEAD
    - AIR POLLUTANTS, 7147*
  - SCLERODERMA, SYSTEMIC
    - EPIDEMIOLOGY, REVIEW, 6625

- HAMARTOMA
  - LEUKEMIA, LYMPHOBLASTIC
    - PRECANCEROUS CONDITIONS, 7063*
  - RHABDOMYOSARCOMA
    - PRECANCEROUS CONDITIONS, 7063*

- HEART NEOPLASMS
  - DIETARY FATS
    - MOUSE, 6775*
    - NEOPLASM METASTASIS, 6775*
  - ESTRADIOL
    - MOUSE, 6775*
    - NEOPLASM METASTASIS, 6775*
  - FIBROMA
    - CASE REPORT, CHILD, 6991
    - ULTRASTRUCTURAL STUDY, 6991
  - FIBROSARCOMA
    - MOUSE, 6775*
  - RHABDOMYOSARCOMA
    - MOUSE, 6775*

- HEAVY CHAIN DISEASE
  - LYMPHOCYTOSIS
    - CASE REPORT, 7076*

- HELA CELLS
  - CELL DIVISION
    - CELL CYCLE KINETICS, REVIEW, 6655*
  - DNA REPLICATION
    - CELL CYCLE KINETICS, REVIEW, 6655*
  - RNA, TRANSFER
    - TYROSINE ISOACCEPTORS, 7172

- HEMANGIOBLASTOMA
  - SEE ANGIOSARCOMA

- HEMANGIOENDOTHELIOMA
  - CALCIUM
    - DNA REPLICATION, 7160
  - CELLS, CULTURED
    - DNA REPLICATION, 7160
  - LIVER NEOPLASMS
    - AFLATOXIN B1, 6725*

- HEMANGIOMA
  - EYE NEOPLASMS
    - CASE REPORT, 6981
    - ULTRASTRUCTURAL STUDY, 6981
  - LIVER NEOPLASMS
    - DIETHYLAMINE, N-NITROSO-, 6707
    - DIMETHYLAMINE, N-NITROSO-, 6710

- HEMATOLOGIC DISEASES
  - LEUKEMIA
    - PRECANCEROUS CONDITIONS, 7068*

- HEMATOPOIETIC STEM CELLS
  - CELL DIVISION
    - CELL TRANSFORMATION, NEOPLASTIC, REVIEW, 6664*
  - LEUKEMIA
    - CELL DIFFERENTIATION, REVIEW, 6616
    - PRECANCEROUS CONDITIONS, REVIEW, 6628

- HEMOCYANIN
  - B-LYMPHOCYTES
    - ANTIGEN-ANTIBODY REACTIONS, 6948*
    - TOLERANCE INDUCTION, 6948*

- HEMOGLOBIN C
  - BURKITT'S LYMPHOMA
    - EPIDEMIOLOGY, GHANA, 7102

- HEMOGLOBINS
  - VIRUS, FRIEND MURINE LEUKEMIA
    - INTERFERON, 6886*
    - METHANE, SULFINYLBIS-, 6837

- HEPARIN
  - LUNG NEOPLASMS
    - NEOPLASM METASTASIS, 7159

- HEPATOCARCINOMA
  - SEE HEPATOMA

- HEPATOMA
  - ACETAMIDE, N-FLUOREN-2-YL-
    - ENZYMATIC ACTIVITY, REVIEW, 6631
  - ACETAMIDE, N-FLUOREN-2-YLDI-
    - PRECANCEROUS CONDITIONS, 6731*
    - STRAIN DIFFERENCE, RAT, 6731*
  - ACETAMIDE, N,N'-9H-FLUORENE-2,7-DIYLBIS-
    - DOSE-RESPONSE STUDY, MOUSE, 6676
  - ACTINOMYCIN D
    - ENZYMATIC ACTIVITY, REVIEW, 6631
  - AFLATOXIN B1
    - FETAL GLOBULINS, 6725*
    - PRECANCEROUS CONDITIONS, 6725*
  - AMERICIUM
    - DOSE-RESPONSE STUDY, MOUSE, 6798
  - ANDROGENS
    - ANEMIA, APLASTIC, 7007
    - CASE REPORT, 7007
  - ANILINE, N,N-DIMETHYL-P-PHENYLAZO-
    - RNA POLYMERASE, 6675
  - ASBESTOS
    - CARCINOGENIC ACTIVITY, 6734*
  - CARCINOGEN, CHEMICAL
    - MOUSE, REVIEW, 6602
    - REVIEW, 6611
  - CELL MEMBRANE
    - COMPLEMENT, 6952*
    - HYBRID CELLS, 7163
    - IMMUNOGLOBULINS, 6952*
  - CHLOROFORM
    - DOSE-RESPONSE STUDY, RAT, MOUSE,

6738*
    - HISTOLOGICAL STUDY, RAT, MOUSE, 6738*
  - COMPLEMENT
    - BINDING, 6952*
  - CONTRACEPTIVES, ORAL
    - CASE REPORT, 7006
  - DIETHYLAMINE, N-NITROSO-
    - ALPHA-AMANITINE, 6766*
    - CARCINOGENIC ACTIVITY, RAT, 6765*, 6766*
    - DNA POLYMERASE, 6765*
    - REVERSE TRANSCRIPTASE, 6765*
    - RNA POLYMERASE, 6765*
  - EPIDEMIOLOGY
    - GAMBIA, 7111
    - MOUSE, REIVEW, 6602
    - REVIEW, 6611
  - FETAL GLOBULINS
    - REVIEW, 6611
  - GLUCOSE
    - ENZYMATIC ACTIVITY, REVIEW, 6631
  - HYBRID CELLS
    - AGGLUTINATION, 7163
    - CELL TRANSFORMATION, NEOPLASTIC, 7163
    - CONTACT INHIBITION, 7163
    - PEPTIDES, 7163
  - IGG
    - BINDING, 6952*
  - IMMUNOGLOBULINS
    - BINDING, 6952*
  - L CELLS
    - HYBRID CELLS, 7163
  - LIVER CIRRHOSIS
    - EPIDEMIOLOGY, 7109
  - PRECANCEROUS CONDITIONS
    - LIVER CIRRHOSIS, 7109
  - RIBOSOMAL PROTEINS
    - ISOLATION AND CHARACTERIZATION, 7168
  - RIBOSOMES
    - ULTRASTRUCTURAL STUDY, 7168
  - RNA, MESSENGER
    - FRUCTOSEDIPHOSPHATE ALDOLASE, 7181
    - ISOENZYMES, 7181
    - POLYRIBOSOMES, 7181
  - RNA POLYMERASE
    - ISOLATION AND CHARACTERIZATION, 6675
  - RNA, RIBOSOMAL
    - ENZYMATIC ACTIVITY, 7182
  - SARCOMA
    - MIGRATION INHIBITORY FACTOR, 6918
  - SERINE DEHYDRATASE
    - ENZYMATIC ACTIVITY, REVIEW, 6631
  - SUCCINATES
    - LYASES, 7184
  - TRYPTOPHAN OXYGENASE
    - ENZYMATIC ACTIVITY, REVIEW, 6631

HERBS
  - ESOPHAGEAL NEOPLASMS
    - HISTIOCYTOMA, 6743*

HEREDITARY DISEASES
  - CELL TRANSFORMATION, NEOPLASTIC
    - CHROMATID EXCHANGES, 7057*

HETEROCHROMATIN
  - CHROMOSOME ABERRATIONS
    - C-BANDING, PEROMYSCUS, 7056*
  - SEX CHROMOSOMES
    - C-BANDING, PEROMYSCUS, 7056*

HETEROXANTHINE, ISOBUTYL-
  - PHOSPHODIESTERASES
    - RADIATION-PROTECTIVE AGENTS, 6806*
  - RADIATION, IONIZING
    - CELL CYCLE KINETICS, HAMSTER OVARY, 6806*
    - RADIATION-PROTECTIVE AGENTS, 6806*

HISTIOCYTES
  - LEUKEMIA, HAIRY CELL
    - CELL DIFFERENTIATION, 7070*

HISTIOCYTOMA
  - ESOPHAGEAL NEOPLASMS
    - HERBS, 6743*
    - TANNINS, 6743*
    - TEA, 6743*

HISTOCOMPATIBILITY ANTIGENS
  - ASTROCYTOMA
    - CELL MEMBRANE, 7141*
  - CELL TRANSFORMATION, NEOPLASTIC
    - IMMUNE RESPONSE, REVIEW, 6621
  - FIBROSARCOMA
    - ANTIBODY DISSOCIATION, 6924
    - ANTIGEN-ANTIBODY COMPLEX, 6924
  - IGM
    - ANTIBODY FORMATION, 6943*
  - LEUKEMIA
    - CELL MEMBRANE, 7141*
  - LEUKEMIA, LYMPHOCYTIC
    - GRAFT VS HOST REACTION, 6929
    - T-LYMPHOCYTES, 6929
    - RADIATION, IONIZING, 6929
    - THYMUS GLAND, 6929
    - VIRUS, RADIATION LEUKEMIA, 6929
  - LYMPHOMA
    - TRANSPLANTATION IMMUNOLOGY, 6944*
  - NEUROBLASTOMA
    - CELL MEMBRANE, 7141*
  - RHABDOMYOSARCOMA
    - CELL MEMBRANE, 7141*
  - SARCOMA, OSTEOGENIC
    - CELL MEMBRANE, 7141*

HISTONES
  - ACETAMIDE, N-(ACETYLOXY)-N-9H-FLUOREN-2-YL-
    - DNA REPAIR, 6795
  - CARCINOMA, EHRLICH TUMOR
    - ALKALINE PHOSPHATASE, 7167
    - CELL CYCLE KINETICS, 7167
    - PHOSPHORYLATION, 7167
  - ULTRAVIOLET RAYS
    - DNA REPAIR, 6795
  - VIRUS, POLYOMA
    - DNA REPLICATION, 6862

HODGKIN'S DISEASE
  - AGE FACTORS
    - EPIDEMIOLOGY, 7100
  - ANTIGENS
    - HYPERSENSITIVITY, DELAYED, REVIEW,

6652*

- CHROMOSOMES, HUMAN, 13-15
  - CHROMOSOME ABNORMALITIES, 7060*
- GRANULOMA
  - ULTRASTRUCTURAL STUDY, 7083*
- INFECTIOUS MONONUCLEOSIS
  - ANTIGENS, VIRAL, 7084*
  - CASE REPORT, 7084*
  - VIRUS, EPSTEIN-BARR, 7084*
- LYMPHOCYTES
  - HISTOLOGICAL STUDY, 7066*
- LYMPHOSARCOMA
  - ANTIGENIC DETERMINANTS, 6927
- OCCUPATIONAL HAZARD
  - EPIDEMIOLOGY, 7123
- PHAGOCYTE BACTERICIDAL DYSFUNCTION
  - HYPERSENSITIVITY, DELAYED, REVIEW, 6652*
- VIRUS, EPSTEIN-BARR
  - ANTIBODIES, 6905*

- HORMONES
  - BREAST NEOPLASMS
    - EPIDEMIOLOGY, REVIEW, 6624
  - CELL MEMBRANE
    - RECEPTORS, 6637
  - INSULIN
    - CELL MEMBRANE, 6637
    - RECEPTORS, 6637
  - NEOPLASMS
    - ULTRASTRUCTURAL STUDY, 7010
  - PITUITARY NEOPLASMS
    - ANILINE, 2,4,6-TRIMETHYL-, 6733*
    - CELL LINE, 6733*

- HYALURONIDASE
  - VIRUS, POLYOMA
    - GLYCOPROTEINS, 6864
    - MUCOPOLYSACCHARIDES, 6864
  - VIRUS, ROUS SARCOMA
    - GLYCOPROTEINS, 6864
    - MUCOPOLYSACCHARIDES, 6864

- HYBRID CELLS
  - CELL TRANSFORMATION, NEOPLASTIC
    - REVIEW, 6663*
  - HEPATOMA
    - AGGLUTINATION, 7163
    - CELL MEMBRANE, 7163
    - CONTACT INHIBITION, 7163
    - L CELLS, 7163
    - PEPTIDES, 7163
  - L CELLS
    - AGGLUTINATION, 7163
    - CELL MEMBRANE, 7163
    - CONTACT INHIBITION, 7163
    - PEPTIDES, 7163
  - NEOPLASMS, EMBRYONAL AND MIXED
    - CELL DIFFERENTIATION, 7152
  - NEOPLASMS, EXPERIMENTAL
    - KARYOTYPING, 6663*
    - REVIEW, 6663*
  - VIRUS, RNA TUMOR
    - CELL TRANSFORMATION, NEOPLASTIC, 6663*
    - VIRUS REPLICATION, 6663*
  - XERODERMA PIGMENTOSUM
    - DNA REPAIR, 6794

- HYDRAZINE, 1,2-DIMETHYL-
  - ADENOCARCINOMA
    - ULTRASTRUCTURAL STUDY, 6739*
  - CARCINOMA
    - ULTRASTRUCTURAL STUDY, 6739*
  - COLONIC NEOPLASMS
    - ADENOCARCINOMA, 6704
    - BACTERIA, 6703
    - CARCINOMA, 6704
    - CHROMOSOMES, 6704
    - EPITHELIUM, 6704
    - RAT, GERM-FREE, 6703
  - DUODENAL NEOPLASMS
    - ADENOCARCINOMA, 6739*, 7092*
    - CARCINOMA, 6739*
    - POLYPS, 6739*, 7092*
    - ULTRASTRUCTURAL STUDY, 6739*, 7092*
  - INTESTINAL NEOPLASMS
    - ADENOCARCINOMA, 6739*, 7092*
    - CARCINOMA, 6739*
    - POLYPS, 6739*, 7092*
    - ULTRASTRUCTURAL STUDY, 6739*, 7092*
  - POLYPS
    - ULTRASTRUCTURAL STUDY, 6739*

- HYDRAZINE, 1,1,2-TRIMETHYL-, HYDROCHLORIDE
  - ADENOMA
    - CARCINOGENIC POTENTIAL, MOUSE, 6740*
  - ANGIOSARCOMA
    - CARCINOGENIC POTENTIAL, MOUSE, 6740*
  - KIDNEY NEOPLASMS
    - ADENOMA, 6740*
  - NEOPLASMS, VASCULAR TISSUE
    - ANGIOSARCOMA, 6740*
  - LUNG NEOPLASMS
    - ADENOMA, 6740*

- HYDROCEPHALUS
  - ETHYLENE, CHLORO- POLYMER
    - EPIDEMIOLOGY, 6735*

- HYDROGEN-ION CONCENTRATION
  - DNA
    - DEOXYRIBONUCLEASE, 6718

- HYDROPEROXIDE
  - ACETOHYDROXAMIC ACID, N-FLUOREN-2-YL-
    - CARCINOGENIC METABOLITE, 6678

- HYDROXYACETYLAMINOFLUORENE
  - SEE ACETOHYDROXAMIC ACID, N-FLUOREN-2-YL-

- HYDROXYLASES
  - BENZO(A)PYRENE
    - ACETAMIDE, N-FLUOREN-2-YL-, 6749*
    - ACETIC ACID, (ETHYLENEDINITRILO) TETRA-, 6749*
    - BENZENE, 4-ALLYL-1,2-(METHYLENEDIOXY)-, 6749*
    - 2-BIPHENYLOL, 6749*
    - ESTRADIOL, 6749*
    - GLUTATHIONE, 6749*
  - TILORONE
    - MICROSOMES, LIVER, 6694

- HYPERCHOLESTEREMIA
  - FIBROBLASTS
    - CHOLESTEROL, 6911*
    - LIPOPROTEINS, 6911*
    - OXIDOREDUCTASES, 6911*

- HYPERPLASIA
  - BLADDER NEOPLASMS
    - ACETAMIDE, N-FLUOREN-2-YL-, 6727*
  - BREAST NEOPLASMS
    - NEOPLASMS, MULTIPLE PRIMARY, 7004
  - GASTRIC MUCOSA
    - ENDOSCOPIC STUDY, 7018
  - GASTROINTESTINAL NEOPLASMS
    - ENDOSCOPIC STUDY, 7018
  - LANGERHANS CELLS
    - GRANULES, 7071*
  - POLYCYTHEMIA VERA
    - PHOSPHORUS, 6959

- HYPERSENSITIVITY, DELAYED
  - GRANULOMA
    - IMMUNE RESPONSE, REVIEW, 6651*

- HYPERTHYROIDISM
  - IGG
    - ANTIGEN-ANTIBODY COMPLEX, 6921
  - IMMUNE SERUMS
    - IGG, 6921

- IGA
  - STOMACH NEOPLASMS
    - ANEMIA, PERNICIOUS, 6957

- IGG
  - CARCINOMA, BRONCHOGENIC
    - ANTIGEN-ANTIBODY COMPLEX, 6921
    - IMMUNE SERUMS, 6921
  - HEPATOMA
    - BINDING, 6952*
  - HYPERTHYROIDISM
    - ANTIGEN-ANTIBODY COMPLEX, 6921
    - IMMUNE SERUMS, 6921
  - B-LYMPHOCYTES
    - COMPLEMENT, 6931
    - IMMUNOGLOBULINS, FC, 6931, 6953*
  - THYROIDITIS
    - ANTIGEN-ANTIBODY COMPLEX, 6921
    - IMMUNE SERUMS, 6921

- IGM
  - ANTIBODY FORMATION
    - ALLOGENEIC SUPPRESSIVE FACTOR, 6943*
  - HISTOCOMPATIBILITY ANTIGENS
    - ANTIBODY FORMATION, 6943*
  - ISOANTIGENS
    - ANTIBODY FORMATION, 6943*
  - LEUKEMIA, LYMPHOBLASTIC
    - IMMUNE RESPONSE, 7077*
    - PURINE-6-THIOL, 7077*
    - SERUM LEVELS, 7077*
  - B-LYMPHOCYTES
    - COMPLEMENT, 6931
    - IMMUNOGLOBULINS, FC, 6931, 6953*
  - LYMPHOCYTOSIS
    - PARAPROTEINEMIAS, 7076*
  - STOMACH NEOPLASMS
    - ANEMIA, PERNICIOUS, 6957

- IMMUNE SERUMS
  - CARCINOMA, BRONCHOGENIC
    - IGG, 6921
  - HYPERTHYROIDISM
    - IGG, 6921
  - LEUKEMIA L1210
    - INTERFERON, 6925
  - THYROID NEOPLASMS
    - LEUKOCYTE INHIBITION, 6920
  - THYROIDITIS
    - IGG, 6921
  - VIRUS, MURINE SARCOMA
    - ANTIBODY SPECIFICITY, 6922
    - ANTIGENIC DETERMINANTS, 6922
    - IMMUNOGLOBULINS, 6922

- IMMUNITY
  - VIRUS, ROUS SARCOMA
    - NEOPLASM REGRESSION, 6832

- IMMUNITY, CELLULAR
  - ADRENAL CORTEX HORMONES
    - STRESS, 6934*
  - CELLS, CULTURED
    - TRANSPLANTATION IMMUNOLOGY, 6901*
  - FIBROSARCOMA
    - RNA, 6932
  - KIDNEY NEOPLASMS
    - SARCOMA, 6933*
  - T-LYMPHOCYTES
    - LYMPHOCYTE CULTURE TEST, MIXED, 6947*
  - LYMPHOMA
    - T-LYMPHOCYTES, 6919
    - VIRUS, GROSS MURINE LEUKEMIA, 6919, 6937*
    - XENOGENEIC ADOPTIVE TRANSFER, 6937*
  - LYMPHOSARCOMA
    - COLONY INHIBITION, 6927
    - LYMPHOCYTES, 6927
  - MAMMARY NEOPLASMS, EXPERIMENTAL
    - CARCINOMA, 6901*, 6933*
  - MELANOMA
    - NEOPLASM METASTASIS, 6923
  - PACTAMYCIN
    - DNA REPLICATION, 6947*
  - RNA
    - ISOLATION AND CHARACTERIZATION, 6932
  - SARCOMA
    - CELL ADHESION, 6940*
    - CHOLANTHRENE, 3-METHYL-, 6940*
    - NEOPLASM TRANSPLANTATION, 6940*
  - THYMUS GLAND
    - CELL TRANSFORMATION, NEOPLASTIC, 6933*
    - TRANSPLANTATION, HOMOLOGOUS, 6933*
  - THYROID NEOPLASMS
    - ANTIGENS, NEOPLASM, 6920
    - CARCINOMA, 6920
    - LEUKOCYTE INHIBITION, 6920
  - TRANSPLANTATION, HOMOLOGOUS
    - CELL TRANSFORMATION, NEOPLASTIC, 6933*
  - VIRUS, HERPES SIMPLEX 1
    - LYMPHOCYTE TRANSFORMATION, 6872
  - VIRUS, HERPES SIMPLEX 2
    - LYMPHOCYTE TRANSFORMATION, 6872

- VIRUS, MOLONEY MURINE SARCOMA
  - ANTIGENS, NEOPLASM, 6850
  - LYMPHOCYTE CULTURE TEST, MIXED, 6850
  - T-LYMPHOCYTES, 6850
  - SPLEEN, 6850
- VIRUS, POLYOMA
  - TRANSPLANTATION IMMUNOLOGY, 6901*
- VIRUS, ROUS SARCOMA
  - NEOPLASM REGRESSION, 6832
- VIRUS, VISNA
  - REVIEW, 6618

IMMUNITY, PASSIVE
- LEUKEMIA L1210
  - INTERFERON, 6925
- LYMPHOMA
  - ANTIGENS, NEOPLASM, 6919
  - T-LYMPHOCYTES, 6919
  - VIRUS, GROSS MURINE LEUKEMIA, 6937*

IMMUNIZATION
- VIRUS, MURINE LEUKEMIA
  - ANTIGENS, 6843

IMMUNOGLOBULINS
- SEE ALSO IGA/IGD/IGE/IGM
- HEPATOMA
  - BINDING, 6952*
  - CELL MEMBRANE, 6952*
- LEUKEMIA, LYMPHOCYTIC
  - LYMPHOCYTE TRANSFORMATION, 6995
- LEUKEMIA, MYELOBLASTIC
  - LYMPHOCYTE TRANSFORMATION, 6995
- MELANOMA
  - ISOLATION AND CHARACTERIZATION, REVIEW, 6935*
- VIRUS, MURINE SARCOMA
  - IMMUNE SERUMS, 6922

IMMUNOGLOBULINS, FC
- B-LYMPHOCYTES
  - ALLOANTIGENS, 6931
  - CELL DIFFERENTIATION, 6931
  - IGG, 6931, 6953*
  - IGM, 6931, 6953*

IMMUNOGLOBULINS, LIGHT CHAIN
- LEUKEMIA, LYMPHOCYTIC
  - CASE REPORT, 7080*
  - CELLULAR INCLUSIONS, 7080*
- PLASMACYTOMA
  - RNA, MESSENGER, 7171

IMMUNOGLOBULINS, SURFACE
- LEUKEMIA, MYELOCYTIC
  - CELL DIFFERENTIATION, 6950*
- B-LYMPHOCYTES
  - LIVER, FETUS, 6949*
  - VARIABLE REGION DETERMINANTS, 6951*
- T-LYMPHOCYTES
  - VARIABLE REGION DETERMINANTS, 6951*
- MAMMARY NEOPLASMS, EXPERIMENTAL
  - ANTIGEN-ANTIBODY COMPLEX, 6954*

IMMUNOLOGIC DEFICIENCY SYNDROMES
- LEUKEMIA
  - IMMUNE RESPONSE, REVIEW, 6627
- LYMPHOMA
  - CLASSIFICATION, REVIEW, 6638

IMMUNOLOGIC DISEASES
- SCLERODERMA, SYSTEMIC
  - EPIDEMIOLOGY, REVIEW, 6625

IMMUNOSUPPRESSION
- CARCINOMA, EHRLICH TUMOR
  - MITOSIS, 7048*
- CELL TRANSFORMATION, NEOPLASTIC
  - IMMUNE RESPONSE, REVIEW, 6621
- COLONIC NEOPLASMS
  - CARCINOMA, 6941*
- NEOPLASM TRANSPLANTATION
  - ISOANTIBODIES, 6924
- SARCOMA
  - NEOPLASM METASTASIS, REVIEW, 6620
- SARCOMA, KAPOSI'S
  - TRANSPLANTATION, HOMOLOGOUS, 6965

IMMUNOSUPPRESSIVE AGENTS
- ANTIGENS
  - HYPERSENSITIVITY, DELAYED, REVIEW, 6652*

INDOLINE, 2-METHYL-
- CYTOCHROME P-450
  - MICROSOMES, LIVER, 6690
  - THIOPYROPHOSPHORIC ACID, TETRAETHYL ESTER, 6690

INFECTIOUS MONONUCLEOSIS
- HODGKIN'S DISEASE
  - ANTIGENS, VIRAL, 7084*
  - CASE REPORT, 7084*
  - VIRUS, EPSTEIN-BARR, 7084*
- VIRUS, EPSTEIN-BARR
  - ANIMAL MODE, MARMOSET, 6868
  - ANTIBODIES, 6905*
  - PHARYNX, 6908*
  - SALIVA, 6908*
  - VIRUS, SHEDDING, 6908*

INSULIN
- BENZ(A)ANTHRACENE, 7,12-DIMETHYL-
  - DNA REPLICATION, 6682
- BENZENESULFONIC ACID
  - ISOBUTYRIC ACID, ALPHA-AMINO-, 6812*
- BENZOIC ACID, 3,3'-DITHIOBIS-6-NITRO-
  - ISOBUTYRIC ACID, ALPHA-AMINO-, 6812*
- CELL MEMBRANE
  - RECEPTORS, 6637
- DNA REPLICATION
  - FIBROBLASTS, REVIEW, 6646*
- HORMONES
  - CELL MEMBRANE, 6637
  - RECEPTORS, 6637
- ISLET CELL TUMOR
  - GLUCOSE, 6726*
  - NICOTINAMIDE, 6726*
  - STREPTOZOTICIN, 6726*
- T-LYMPHOCYTES
  - ISOBUTYRIC ACID, ALPHA-AMINO-, 6812*

- MAMMARY NEOPLASMS, EXPERIMENTAL
  - BENZ(A)ANTHRACENE, 7,12-DIMETHYL-, 6682

INTERFERON
- LEUKEMIA L1210
  - ANTIGENS, NEOPLASM, 6925
  - IMMUNE SERUMS, 6925
  - IMMUNITY, PASSIVE, 6925
- VIRUS, FRIEND MURINE LEUKEMIA
  - ERYTHROPOIESIS, 6886*
  - HEMOGLOBINS, 6886*
  - VIRUS, NEWCASTLE DISEASE, 6886*
  - VIRUS REPLICATION, 6886*
- VIRUS, KIRSTEN MURINE SARCOMA
  - VIRUS REPLICATION, 6897*

INTESTINAL DISEASES
- DIET
  - DIETARY FIBER, REVIEW, 6607

INTESTINAL NEOPLASMS
- ADENOCARCINOMA
  - HYDRAZINE, 1,2-DIMETHYL-, 7092*
  - ISOANTIGENS, 7091*
  - ULTRASTRUCTURAL STUDY, 7092*
- BACTEROIDES DISTASONIS
  - STEROIDS, 6665
- BACTEROIDES FRAGILIS
  - STEROIDS, 6665
- BACTEROIDES THETAIOTAOMICRON
  - STEROIDS, 6665
- BACTEROIDES VULGATUS
  - STEROIDS, 6665
- CARCINOMA
  - AFLATOXIN, 6723*
  - ISOANTIGENS, 7091*
- CARCINOMA, MUCINOUS
  - ISOANTIGENS, 7091*
- P-CRESOL
  - EXCRETION, URINE, 6724*
- DIET
  - EPIDEMIOLOGY, REVIEW, 6610
  - FIBERS, REVIEW, 6608
- DIETARY FATS
  - EPIDEMIOLOGY, REVIEW, 6608
- ENTERITIS, REGIONAL
  - EPIDEMIOLOGY, 6614
  - REVIEW, 6614
- HYDRAZINE, 1,2-DIMETHYL-
  - ADENOCARCINOMA, 6739*
  - CARCINOMA, 6739*
  - POLYPS, 6739*
  - ULTRASTRUCTURAL STUDY, 6739*, 7092*
- METHANE, AZOXY-
  - RAT, GERM-FREE, 6703
- POLYPS
  - HYDRAZINE, 1,2-DIMETHYL-, 7092*
  - ULTRASTRUCTURAL STUDY, 7092*
- PRECANCEROUS CONDITIONS
  - EPIDEMIOLOGY, 6614
  - REVIEW, 6614
- TRYPTOPHAN
  - EPIDEMIOLOGY, 6722*

INTRAUTERINE DEVICES
- CERVIX NEOPLASMS
  - EPIDEMIOLOGY, 7143*

IODINE
- BREAST NEOPLASMS
  - DIET, 7140*
  - METABOLISM, 7140*

IODINE RADIOISOTOPES
- CELL MEMBRANE
  - CELL CYCLE KINETICS, 6819*
- OVARIAN NEOPLASMS
  - ANTI-NEOPLASTIC ACTIVITY, MOUSE, 6818*
  - URIDINE, 2'-DEOXY-5-IODO-, 6818*
- RADIATION EFFECTS, HAMSTER OVARY
  - CELL CYCLE KINETICS, 6819*
- RADIATION, IONIZING
  - CELL MEMBRANE, 6819*
- THYROID NEOPLASMS
  - RISK FACTORS, REVIEW, 6639

ISLET CELL TUMOR
- DUODENAL NEOPLASMS
  - CASE REPORT, 7089*
  - GASTRIN, 7089*
- GLUCOSE
  - INSULIN, 6726*
- NICOTINAMIDE
  - INSULIN, 6726*
- PANCREATIC NEOPLASMS
  - CASE REPORT, 7089*
  - GASTRIN, 7089*
- STREPTOZOTICIN
  - INSULIN, 6726*
- ZOLLINGER-ELLISON SYNDROME
  - CASE REPORT, 7089*

ISOANTIBODIES
- FIBROSARCOMA
  - CHOLANTHRENE, 3-METHYL-, 6924
- NEOPLASM TRANSPLANTATION
  - IMMUNOSUPPRESSION, 6924

ISOANTIGENS
- ANTIGENIC DETERMINANTS
  - S-49 CELLS, 6945*
- COLONIC NEOPLASMS
  - CARCINOMA, 7091*
  - POLYPS, 7091*
- IGM
  - ANTIBODY FORMATION, 6943*
- INTESTINAL NEOPLASMS
  - ADENOCARCINOMA, 7091*
  - CARCINOMA, 7091*
  - CARCINOMA, MUCINOUS, 7091*
- LEUKEMIA
  - PRECANCEROUS CONDITIONS, REVIEW, 6626
- B-LYMPHOCYTES
  - ANTIBODY FORMATION, 6942*
- T-LYMPHOCYTES
  - ANTIBODY FORMATION, 6942*
- NEURAMINIDASE
  - S-49 CELLS, 6945*
- RADIATION, IONIZING
  - GRAFT VS HOST REACTION, 6942*
- SIALIC ACIDS
  - S-49 CELLS, 6945*
- SPLEEN
  - ALLOGENEIC SUPPRESSIVE FACTOR, 6942*

- ISOBUTYRIC ACID, ALPHA-AMINO-
  - BENZENESULFONIC ACID
    - T-LYMPHOCYTES, 6812*
  - BENZOIC ACID, 3,3'-DITHIOBIS-6-NITRO-
    - T-LYMPHOCYTES, 6812*
  - INSULIN
    - BENZENESULFONIC ACID, 6812*
    - BENZOIC ACID, 3,3'-DITHIOBIS-6-NITRO-, 6812*
    - T-LYMPHOCYTES, 6812*
  - RADIATION, IONIZING
    - BENZENESULFONIC ACID, 6812*
    - BENZOIC ACID, 3,3'-DITHIOBIS-6-NITRO-, 6812*
    - T-LYMPHOCYTES, 6812*

- ISOENZYMES
  - HEPATOMA
    - RNA, MESSENGER, 7181

- ISONICOTINIC ACID HYDRAZIDE
  - NEOPLASMS
    - TUBERCULOSIS, 6706

- ISOPHOSPHAMIDE
  - LUNG NEOPLASMS
    - NEOPLASM METASTASIS, 7159

- ISOTHIOCYANIC ACID, ETHYL ESTER
  - MICROSOMES, LIVER
    - METABOLISM, 6750*

- ISOTHIOCYANIC ACID, 1-NAPHTHYL ESTER
  - LIVER NEOPLASMS
    - CARCINOGENIC ACTIVITY, 6723*
    - SARCOMA, OSTEOGENIC, 6723*

- KAOLIN
  - STOMACH NEOPLASMS
    - ULTRASTRUCTURAL STUDY, 7019

- KARYOTYPING
  - BREAST NEOPLASMS
    - CELLS, CULTURED, 7162
  - CARCINOGEN, CHEMICAL
    - CHROMOSOMES, 6671
  - GYNECOLOGIC NEOPLASMS
    - CELLS, CULTURED, 7162
  - LEUKEMIA, MYELOBLASTIC
    - CHROMOSOME ABERRATIONS, 6960
  - MELANOMA
    - CELL LINE, 7194*
    - CELLS, CULTURED, 7162
  - NEOPLASMS, EXPERIMENTAL
    - HYBRID CELLS, 6663*
  - SKIN NEOPLASMS
    - FISHES, 7151*

- KIDNEY NEOPLASMS
  - ADENOCARCINOMA
    - VIRUS, LEOPARD FROG CARCINOMA, 7196*
  - ADENOMA
    - HYDRAZINE, 1,1,2-TRIMETHYL-, HYDROCHLORIDE, 6740*
  - AMERICIUM
    - DOSE-RESPONSE STUDY, MOUSE, 6798
  - CARCINOMA
    - AMERICIUM, 6798
    - ASBESTOS, 6734*
  - CARCINOMA, BRONCHOGENIC
    - CASE REPORT, 7034*
  - CHLOROFORM
    - DOSE-RESPONSE STUDY, RAT, MOUSE, 6738*
    - HISTOLOGICAL STUDY, RAT, MOUSE, 6738*
  - DIMETHYLAMINE, N-NITROSO-
    - CARCINOGENIC ACTIVITY, 6710
  - LEAD
    - OCCUPATIONAL HAZARD, 7118
  - LUNG NEOPLASMS
    - CARCINOMA, BRONCHOGENIC, 7034*
    - CASE REPORT, 7034*
    - NEOPLASM METASTASIS, 7034*
  - NEOPLASM METASTASIS
    - CASE REPORT, 7034*
  - PROPYLAMINE, N-NITROSO-BIS(2-ACETOXY)-
    - HISTOLOGICAL STUDY, HAMSTER, 6680
  - SARCOMA
    - IMMUNITY, CELLULAR, 6933*
    - TRANSPLANTATION, HOMOLOGOUS, 6933*
  - SUCCINATES
    - LYASES, 7184
  - UREA, ETHYL NITROSO-
    - TRANSPLACENTAL CARCINOGENESIS, RABBIT, 6769*
  - VIRUS, LEOPARD FROG CARCINOMA
    - AMINO ACIDS, 7196*
    - CARBOXYLIC ACIDS, 7196*
    - CELLULAR INCLUSIONS, 7196*
    - GLYCOGEN, 7196*
    - NUCLEIC ACIDS, 7196*
    - SULFHYDRYL COMPOUNDS, 7196*

- KININS
  - CARBOXYPEPTIDASES
    - FIBROBLASTS, 7180

- L CELLS
  - CELL MEMBRANE
    - HYBRID CELLS, 7163
  - COLCHICINE
    - AGGLUTINATION, 6955*
  - CONCANAVALIN A
    - AGGLUTINATION, 6955*
  - ERYTHROCYTES
    - AGGLUTINATION, 6955*
  - HEPATOMA
    - HYBRID CELLS, 7163
  - HYBRID CELLS
    - AGGLUTINATION, 7163
    - CONTACT INHIBITION, 7163
    - PEPTIDES, 7163

- LACTATE DEHYDROGENASE
  - BENZO(A)PYRENE
    - MACROPHAGES, 6751*
  - COLONIC NEOPLASMS
    - DIAGNOSIS AND PROGNOSIS, 7082*
  - DUODENAL NEOPLASMS
    - GUANIDINE, 1-ETHYL-3-NITRO-1-NITROSO-, 7093*
  - LIVER NEOPLASMS
    - NEOPLASM METASTASIS, 7082*

- LANGERHANS CELLS
  - HYPERPLASIA

- GRANULES, 7071*
- RETICULOENDOTHELIOSIS
    - GRANULES, 7071*

LARYNGEAL NEOPLASMS
- CARCINOMA
    - LARYNGITIS, 7042*
    - PRECANCEROUS CONDITIONS, 7042*
- LARYNGITIS
    - PRECANCEROUS CONDITIONS, 7042*
- MYOBLASTOMA
    - CARCINOMA, EPIDERMOID, 6990
    - CASE REPORT, 6990
    - SMOKING, 6990
    - ULTRASTRUCTURAL STUDY, 6990
- NEOPLASMS, MULTIPLE PRIMARY
    - CASE REPORT, 6990
- NEUROMA
    - NEOPLASMS, MULTIPLE PRIMARY, 7049*

LARYNGITIS
- LARYNGEAL NEOPLASMS
    - CARCINOMA, 7042*
    - PRECANCEROUS CONDITIONS, 7042*

LEAD
- DIGESTIVE SYSTEM NEOPLASMS
    - EPIDEMIOLOGY, 7118
    - OCCUPATIONAL HAZARD, 7118
- GASTROINTESTINAL NEOPLASMS
    - AIR POLLUTANTS, 7147*
- GYNECOLOGIC NEOPLASMS
    - AIR POLLUTANTS, 7147*
- KIDNEY NEOPLASMS
    - OCCUPATIONAL HAZARD, 7118
- NERVOUS SYSTEM NEOPLASMS
    - OCCUPATIONAL HAZARD, 7118
- RESPIRATORY TRACT NEOPLASMS
    - AIR POLLUTANTS, 7147*
    - EPIDEMIOLOGY, 7118
    - OCCUPATIONAL HAZARD, 7118

LEIOMYOMA
- EYE NEOPLASMS
    - CASE REPORT, 6981
    - ULTRASTRUCTURAL STUDY, 6981

LEIOMYOSARCOMA
- ASBESTOS
    - CASE REPORT, 7035*
    - ULTRASTRUCTURAL STUDY, 7035*
- LUNG NEOPLASMS
    - ASBESTOS, 7035*
- NEOPLASMS, MUSCLE TISSUE
    - ASBESTOS, 7035*
    - CASE REPORT, 7035*
    - ULTRASTRUCTURAL STUDY, 7035*
- UTERINE NEOPLASMS
    - ULTRASTRUCTURAL STUDY, 7023*

LEPROSY
- ANTIGENS
    - HYPERSENSITIVITY, DELAYED, REVIEW, 6652*

LEUCINE AMINOPEPTIDASE
- DUODENAL NEOPLASMS
    - GUANIDINE, 1-ETHYL-3-NITRO-1-NITROSO-, 7093*

LEUKEMIA
- ANTIGENS, NEOPLASM
    - CELL MEMBRANE, 7141*
    - IMMUNE RESPONSE, REVIEW, 6627
- ANTIGENS, VIRAL
    - ISOLATION AND CHARACTERIZATION, 6845
- BLOOD GROUPS
    - PRECANCEROUS CONDITIONS, REVIEW, 6626
- BLOOD TRANSFUSION
    - EPIDEMIOLOGY, 7101
    - HORIZONTAL TRANSMISSION, 7101
- BONE MARROW CELLS
    - CHROMOSOME ABERRATIONS, 6802
    - PRECANCEROUS CONDITIONS, 6802
- CELLS, CULTURED
    - RADIATION, IONIZING, 6811*
- CHROMOSOME ABERRATIONS
    - CELL TRANSFORMATION, NEOPLASTIC, 6650*
    - PRECANCEROUS CONDITIONS, 6802
    - REVIEW, 6650*
- DIETHYLAMINE, N-NITROSO-
    - STRAIN DIFFERENCE, MOUSE, 6708
- DRUG THERAPY
    - PRECANCEROUS CONDITIONS, 6613
- EPIDEMIOLOGY
    - STATISTICAL ANALYSIS, PET BIRD, 7125*
- ETHYLENE, CHLORO- POLYMER
    - ENVIRONMENTAL HAZARD, 6735*
- FETAL HEMOGLOBIN
    - SERUM LEVELS, 7164
- GLUCOSEPHOSPHATE DEHYDROGENASE
    - CELL DIFFERENTIATION, REVIEW, 6616
- HEMATOLOGIC DISEASES
    - PRECANCEROUS CONDITIONS, 7068*
- HEMATOPOIETIC STEM CELLS
    - CELL DIFFERENTIATION, REVIEW, 6616
    - PRECANCEROUS CONDITIONS, REVIEW, 6628
- HISTOCOMPATIBILITY ANTIGENS
    - CELL MEMBRANE, 7141*
- IMMUNOLOGIC DEFICIENCY SYNDROMES
    - IMMUNE RESPONSE, REVIEW, 6627
- ISOANTIGENS
    - PRECANCEROUS CONDITIONS, REVIEW, 6626
- MYELOPROLIFERATIVE DISORDERS
    - PRECANCEROUS CONDITIONS, REVIEW, 6628
- NEUTRONS
    - DOSE-RESPONSE STUDY, MOUSE, 6810*
- NEUTROPHILS
    - PRECANCEROUS CONDITIONS, 7064*
- OCCUPATIONAL HAZARD
    - EPIDEMIOLOGY, 7123
- PEROXIDASES
    - PRECANCEROUS CONDITIONS, 7064*
- PNEUMOTHORAX, ARTIFICIAL
    - EPIDEMIOLOGY, 7114
- PRECANCEROUS CONDITIONS
    - DIAGNOSIS AND CLASSIFICATION, 7069*
    - DIAGNOSIS AND PROGNOSIS, REVIEW, 6613
    - EPIDEMIOLOGY, JAPAN, 7068*
- RADIATION

        PRECANCEROUS CONDITIONS, 6613
    RADIATION, IONIZING
        DOSE-RESPONSE STUDY, MOUSE, 6810*
        EPIDEMIOLOGY, CHILD, 6825*
        RADIATION CHIMERA, 6822*
    RADIOACTIVE FALLOUT
        PRECANCEROUS CONDITIONS, 6802
    REVERSE TRANSCRIPTASE
        CASE REPORT, 7061*
        DIAGNOSIS, 7061*
        PRECANCEROUS CONDITIONS, 7061*
    TRIAZENE, 3,3-DIETHYL-1-(M-PYRIDYL)-
        CARCINOGENIC ACTIVITY, 6705
    TRIAZENE, 3,3-DIETHYL-1-PHENYL-
        CARCINOGENIC ACTIVITY, 6705
    VIRUS, AVIAN MYELOBLASTOSIS
        DNA REPLICATION, 6828
        DNA, VIRAL, 6828
    VIRUS, C-TYPE RNA TUMOR
        REVERSE TRANSCRIPTASE, REVIEW, 6875
    VIRUS, LACTATE DEHYDROGENASE
        IMMUNE RESPONSE, 6915*
    VIRUS, RAUSCHER MURINE LEUKEMIA
        ANTIGENS, VIRAL, 6845
    VIRUS, RNA TUMOR
        PRECANCEROUS CONDITIONS, 6613

LEUKEMIA, ACUTE LYMPHOCYTIC
    SEE LEUKEMIA, LYMPHOBLASTIC

LEUKEMIA, HAIRY CELL
    CELL DIFFERENTIATION
        CASE REPORT, 7070*
    CELLULAR INCLUSIONS
        CASE REPORT, 6998
        HOVIG TYPE, 6998
        ULTRASTRUCTURAL STUDY, 6998
    ENZYMATIC ACTIVITY
        DIAGNOSIS AND PROGNOSIS, 6999
    ENZYMES
        ACID PHOSPHATASE, 6997
        CASE REPORT, 6997
    HISTIOCYTES
        CELL DIFFERENTIATION, 7070*
    LYMPHOCYTES
        ULTRASTRUCTURAL STUDY, 6998
    MONOCYTES
        CELL DIFFERENTIATION, 7070*
    PHAGOCYTOSIS
        CASE REPORT, 6997
    TARTARIC ACID
        ACID PHOSPHATASE, 6997
        CYTOCHEMICAL STUDY, 6997
    ULTRASTRUCTURAL STUDY
        DIAGNOSIS AND PROGNOSIS, 6999

LEUKEMIA L1210
    ANTIGENS, NEOPLASM
        INTERFERON, 6925
    IMMUNE SERUMS
        INTERFERON, 6925
    INTERFERON
        IMMUNITY, PASSIVE, 6925
    LIVER
        MONOAMINE OXIDASE, 7189

LEUKEMIA, LYMPHOBLASTIC
    ABNORMALITIES, SKELETAL
        CASE REPORT, CHILD, 7062*
    CHILD
        CASE REPORT, 7077*
    CHROMOSOMES
        CYTOGENETICS, CHILD, 6963
    DNA POLYMERASE
        MOLECULAR PROBES, 6622
    HAMARTOMA
        PRECANCEROUS CONDITIONS, 7063*
    IGM
        IMMUNE RESPONSE, 7077*
        SERUM LEVELS, 7077*
    NEVUS, PIGMENTED
        PRECANCEROUS CONDITIONS, 7063*
    NUCLEOTIDYLTRANSFERASES
        CELL DIFFERENTIATION, REVIEW, 6616
    PRECANCEROUS CONDITIONS
        CELL DOUBLING TIMES, 7098
    PURINE-6-THIOL
        IGM, 7077*

LEUKEMIA, LYMPHOCYTIC
    AGE FACTORS
        EPIDEMIOLOGY, 7099
    CELLULAR INCLUSIONS
        IMMUNOGLOBULINS, LIGHT CHAIN, 7080*
    CONCANAVALIN A
        IMMUNE RESPONSE, 6996
    CORTISONE
        GRAFT VS HOST REACTION, 6929
    ETHANEDIOIC ACID, DISODIUM SALT
        RADIAL SEGMENTATION, 7081*
    HISTOCOMPATIBILITY ANTIGENS
        GRAFT VS HOST REACTION, 6929
    IMMUNOGLOBULINS, LIGHT CHAIN
        CASE REPORT, 7080*
    LYMPHOCYTE TRANSFORMATION
        IMMUNOGLOBULINS, 6995
        PLANT AGGLUTININS, 6995
        ROSETTE FORMATION, 6995
        ULTRASTRUCTURAL STUDY, REVIEW, 6630
    LYMPHOCYTES
        ANTIGENS, NEOPLASM, REVIEW, 6630
        IMMUNE RESPONSE, REVIEW, 6630
    B-LYMPHOCYTES
        ULTRASTRUCTURAL STUDY, REVIEW, 6630
    T-LYMPHOCYTES
        HISTOCOMPATIBILITY ANTIGENS, 6929
        ULTRASTRUCTURAL STUDY, REVIEW, 6630
    NEOPLASMS, MULTIPLE PRIMARY
        IMMUNE RESPONSE, 7134*
    PLANT AGGLUTININS
        IMMUNE RESPONSE, 6996
    PRECANCEROUS CONDITIONS
        CELL DOUBLING TIMES, 7098
    RADIATION, IONIZING
        ANTIGENS, 6929
        DOSE-RESPONSE STUDY, 6842
        HISTOCOMPATIBILITY ANTIGENS, 6929
    THYMUS GLAND
        ANTIGENS, 6929
        HISTOCOMPATIBILITY ANTIGENS, 6929
        IMMUNE RESPONSE, 6929
    THYMUS NEOPLASMS
        AGE FACTORS, 6996

- VIRUS, EPSTEIN-BARR
    - LYMPHOCYTES, 6906*
- VIRUS, HERPES SAIMIRI
    - MARMOSETS, 6913*
- VIRUS, MURINE LEUKEMIA
    - AGE FACTORS, 6996
    - THYMUS NEOPLASMS, 6996
- VIRUS, RADIATION LEUKEMIA
    - ANTIGENS, 6929
    - HISTOCOMPATIBILITY ANTIGENS, 6929

LEUKEMIA, MONOBLASTIC
- THORIUM DIOXIDE
    - CASE REPORT, 6826*

LEUKEMIA, MYELOBLASTIC
- ANEMIA, APLASTIC
    - DIAGNOSIS AND PROGNOSIS, 7069*
- BONE MARROW CELLS
    - CELL AGGREGATION, 7154, 7197*
    - CELL DIFFERENTIATION, 7197*
- BUTYRIC ACID, 4-(P-(BIS(2-CHLOROETHYL) AMINO)PHENYL)-
    - ARTHRITIS, RHEUMATOID, 7079*
    - CASE REPORT, 7079*
    - MULTIPLE SCLEROSIS, 7079*
    - PRECANCEROUS CONDITIONS, 7079*
- CELL AGGREGATION
    - REMISSION, 7197*
- CELL DIFFERENTIATION
    - MATHEMATICAL MODEL, 7193*
    - PRECANCEROUS CONDITIONS, 6994
    - REVIEW, 6623
- CHROMOSOME ABERRATIONS
    - CASE REPORT, 7058*
    - G-BANDING, 6960
    - KARYOTYPING, 6960
- CHROMOSOME ABNORMALITIES
    - REVIEW, 6623
- CHROMOSOMES
    - CYTOGENETICS, CHILD, 6963
- CHROMOSOMES, HUMAN, 16-18
    - CHROMOSOME ABERRATIONS, 7059*
- CHROMOSOMES, HUMAN, 21-22
    - CHROMOSOME ABERRATIONS, 7059*
- CYCLOPHOSPHAMIDE
    - ARTHRITIS, RHEUMATOID, 7079*
    - CASE REPORT, 7079*
    - PRECANCEROUS CONDITIONS, 7079*
- DNA POLYMERASE
    - MOLECULAR PROBES, 6622
- DNA REPLICATION
    - PRECANCEROUS CONDITIONS, 6994
- DRUG THERAPY
    - CELL AGGREGATION, 7197*
    - CELL DIFFERENTIATION, 7197*
- ERYTHROPOIESIS
    - PRECANCEROUS CONDITIONS, 6994
    - REVIEW, 6623
- LYMPHOCYTE TRANSFORMATION
    - IMMUNOGLOBULINS, 6995
    - PLANT AGGLUTININS, 6995
    - ROSETTE FORMATION, 6995
- NEUTROPHILS
    - MATHEMATICAL MODEL, 7193*
- OXYMETHOLONE
    - DNA REPLICATION, 7178
- PLANT AGGLUTININS
    - CELL AGGREGATION, 7154
- THORIUM DIOXIDE
    - CASE REPORT, 6826*
- TRISOMY
    - CASE REPORT, 7058*
- VIRUS, WOOLLY MONKEY
    - ANTIGENS, VIRAL, 6857

LEUKEMIA, MYELOCYTIC
- AGE FACTORS
    - EPIDEMIOLOGY, 7099
- BONE MARROW
    - ULTRASTRUCTURAL STUDY, 7037*
- CELL LINE
    - MURAMIDASE, 7187
- CHROMATIN
    - ULTRASTRUCTURAL STUDY, REVIEW, 6629
- CHROMOSOME ABERRATIONS
    - CHROMOSOMES, HUMAN, 6-12, 6964
    - CHROMOSOMES, HUMAN, 21-22, 6964
    - ULTRASTRUCTURAL STUDY, REVIEW, 6629
- CHROMOSOMES, HUMAN, 21-22
    - CHROMOSOME ABERRATIONS, 7059*
- DEXAMETHASONE
    - CELL DIFFERENTIATION, 6950*
- ERYTHROCYTES
    - MITOCHONDRIA, 6961
    - ULTRASTRUCTURAL STUDY, 6961
- ESTRADIOL
    - CELL DIFFERENTIATION, 6950*
- IMMUNOGLOBULINS, SURFACE
    - CELL DIFFERENTIATION, 6950*
- LEUKOCYTES
    - CELL DIFFERENTIATION, 6950*
- LYMPHOCYTES
    - CELL DIFFERENTIATION, 6950*
- MACROPHAGES
    - CELL DIFFERENTIATION, 6950*
- OXYMETHOLONE
    - DNA REPLICATION, 7178
- PRECANCEROUS CONDITIONS
    - CELL DOUBLING TIMES, 7098
- PREDNISOLONE
    - CELL DIFFERENTIATION, 6950*
- RADIATION, IONIZING
    - RADIATION GENETICS, REVIEW, 6643*
- VIRUS, BABOON ENDOGENOUS
    - DNA-RNA HYBRIDIZATION, REVIEW, 6899*
- VIRUS, SIMIAN SARCOMA
    - DNA-RNA HYBRIDIZATION, REVIEW, 6899*
    - DOUBLE INFECTION THEORY, REVIEW, 6899*
- VIRUS, WOOLLY MONKEY
    - ANTIGENS, VIRAL, 6857

LEUKOCYTES
- LEUKEMIA, MYELOCYTIC
    - CELL DIFFERENTIATION, 6950*

LEYDIG CELL TUMOR
- TESTICULAR NEOPLASMS
    - CRYPTORCHISM, 7009

LH
- ESTRADIOL, 17ALPHA-ETHYNYL-
    - SERUM LEVELS, 6788*

- NORGESTREL
  - SERUM LEVELS, 6788*

LINOLEIC ACID
- ACETOHYDROXAMIC ACID, N-FLUOREN-2-YL-
  - CARCINOGENIC METABOLITE, 6678

LIP NEOPLASMS
- NEUROMA
  - NEOPLASMS, MULTIPLE PRIMARY, 7049*

LIPIDS
- CELL TRANSFORMATION, NEOPLASTIC
  - METABOLISM, REVIEW, 6653*

LIPOMA
- ADRENAL GLAND NEOPLASMS
  - ADRENOGENITAL SYNDROME, 7012
- BREAST NEOPLASMS
  - PRECANCEROUS CONDITIONS, 7136*

LIPOPOLYSACCHARIDES
- ESCHERICHIA COLI
  - DNA REPLICATION, 7175
- RADIATION, IONIZING
  - B-LYMPHOCYTES, 6799
  - T-LYMPHOCYTES, 6799

LIPOPROTEINS
- HYPERCHOLESTEREMIA
  - FIBROBLASTS, 6911*
- VIRUS, SV40
  - CELL TRANSFORMATION, NEOPLASTIC, 6911*

LIVER
- AMERICIUM
  - CASE REPORT, RETENTION, 6797
- 1H-AZEPINE, HEXAHYDRO-1-NITROSO-
  - TISSUE DISTRIBUTION, RAT, 6763*
- LEUKEMIA L1210
  - MONOAMINE OXIDASE, 7189
- RNA
  - DNA-RNA HYBRIDIZATION, 7174
- SARCOMA
  - MONOAMINE OXIDASE, 7189

LIVER CIRRHOSIS
- ACETAMIDE, N-FLUOREN-2-YLDI-
  - STRAIN DIFFERENCE, RAT, 6731*
- ETHYL ALCOHOL
  - PROLACTIN, 6642*
- HEPATOMA
  - EPIDEMIOLOGY, 7109
  - PRECANCEROUS CONDITIONS, 7109
- SULPIRIDE
  - PROLACTIN, 6642*
- THYROTROPIN
  - PROLACTIN, 6642*

LIVER NEOPLASMS
- SEE ALSO HEPATOMA
- ACETAMIDE, N-FLUOREN-2-YL-
  - CELL DIVISION, 6728*
  - PRECANCEROUS CONDITIONS, 6728*
  - SIDEROSIS, 6728*
- AFLATOXIN
  - CARCINOGENIC ACTIVITY, 6723*
- AFLATOXIN B1
  - CASE REPORT, 6668
  - FOOD CONTAMINATION, 6668
  - METABOLISM, 6668
- ANGIOSARCOMA
  - ETHYLENE, CHLORO-, 6736*
- ANILINE, N,N-DIMETHYL-P-PHENYLAZO-
  - CARCINOGENIC ACTIVITY, 6723*
- ANTHRACENE
  - CARCINOGENIC ACTIVITY, 6723*
- CARCINOEMBRYONIC ANTIGEN
  - NEOPLASM METASTASIS, 7082*
- CARCINOGEN, CHEMICAL
  - MOUSE, REVIEW, 6602
- CARCINOMA
  - ASBESTOS, 6734*
  - BENZENAMINE, N,N-DIMETHYL-4-((3-METHYLPHENYL)AZO)-, 6686
- CHOLANTHRENE, 3-METHYL-
  - CARCINOGENIC ACTIVITY, 6723*
- CHOLESTEROL
  - CARCINOGENIC ACTIVITY, 6723*
- DIETHYLAMINE, N-NITROSO-
  - STRAIN DIFFERENCE, MOUSE, 6708
- DIMETHYLAMINE, N-NITROSO-
  - CARCINOGENIC ACTIVITY, 6710
  - PRECANCEROUS CONDITIONS, 6728*
- EPIDEMIOLOGY
  - SOUTH AFRICA, 7128*
- ETHYLENE, CHLORO-
  - CASE REPORT, 6736*
- GLUTAMYL TRANSPEPTIDASE
  - NEOPLASM METASTASIS, 7082*
- HEMANGIOENDOTHELIOMA
  - AFLATOXIN B1, 6725*
- HEMANGIOMA
  - DIETHYLAMINE, N-NITROSO-, 6707
  - DIMETHYLAMINE, N-NITROSO-, 6710
- ISOTHIOCYANIC ACID, 1-NAPHTHYL ESTER
  - CARCINOGENIC ACTIVITY, 6723*
  - SARCOMA, OSTEOGENIC, 6723*
- LACTATE DEHYDROGENASE
  - NEOPLASM METASTASIS, 7082*
- NECROSIS
  - CADMIUM, 6779*
  - TANNIC ACID, 6744*
- NEUTRONS
  - DOSE-RESPONSE STUDY, MOUSE, 6810*
- RADIATION, IONIZING
  - DOSE-RESPONSE STUDY, MOUSE, 6810*
- SIDEROSIS
  - CELL DIVISION, 6728*
- TANNIC ACID
  - HISTOLOGICAL STUDY, FISH, 6744*

LIVER REGENERATION
- DNA NUCLEOTIDYLTRANSFERASES
  - CELL MEMBRANE, 7185
  - CYTOPLASM, 7185

LUNG
- BENZ(A)ANTHRACENE
  - RETENTION, MOUSE, HAMSTER, 6752*
- BENZO(A)PYRENE
  - RETENTION, MOUSE, HAMSTER, 6752*
- CHRYSENE
  - RETENTION, MOUSE, HAMSTER, 6752*
- DIBENZ(A,H)ANTHRACENE
  - RETENTION, MOUSE, HAMSTER, 6752*
- 7H-DIBENZO(C,G)CARBAZOLE

    - RETENTION, HAMSTER, 6754*
  - PYRENE
    - RETENTION, MOUSE, HAMSTER, 6752*

- LUNG NEOPLASMS
  - ACTINOMYCIN D
    - NEOPLASM METASTASIS, 6791*
  - ADENOCARCINOMA
    - SMOKING, 7112
  - ADENOMA
    - HYDRAZINE, 1,1,2-TRIMETHYL-, HYDROCHLORIDE, 6740*
  - AMERICIUM
    - DOSE-RESPONSE STUDY, MOUSE, 6798
  - ASBESTOS
    - EPIDEMIOLOGY, 6670, 7121
  - CARCINOMA
    - ASBESTOS, 6734*
    - EXTREMITIES, 7041*
    - NEOPLASM METASTASIS, 7041*
  - CARCINOMA, BRONCHIOLAR
    - AMERICIUM, 6798
  - CARCINOMA, EPIDERMOID
    - SMOKING, 7112
  - CARCINOMA, OAT CELL
    - SMOKING, 7112
  - CORYNEBACTERIUM PARVUM
    - NEOPLASM METASTASIS, 7159
    - NEOPLASM METASTASIS, REVIEW, 6649*
  - CYCLOPHOSPHAMIDE
    - NEOPLASM METASTASIS, 6791*
    - NEOPLASM METASTASIS, REVIEW, 6649*
    - NEOPLASMS METASTASIS, 7159
  - DIETHYLAMINE, N-NITROSO-
    - ENDOCRINE CELLS, 6709
    - PRECANCEROUS CONDITIONS, 6709
    - STRAIN DIFFERENCE, MOUSE, 6708
    - ULTRASTRUCTURAL STUDY, HAMSTER, 6709
  - DIMETHYLAMINE, N-NITROSO-
    - CARCINOGENIC ACTIVITY, 6710
  - EPIDEMIOLOGY
    - SOUTH AFRICA, 7128*
  - HEPARIN
    - NEOPLASM METASTASIS, 7159
  - ISOPHOSPHAMIDE
    - NEOPLASM METASTASIS, 7159
  - KIDNEY NEOPLASMS
    - CARCINOMA, BRONCHOGENIC, 7034*
    - CASE REPORT, 7034*
    - NEOPLASM METASTASIS, 7034*
  - LEIOMYOSARCOMA
    - ASBESTOS, 7035*
  - NEOPLASM METASTASIS
    - ANIMAL MODEL, RAT, 6967
    - URIDINE, 2'-DEOXY-5-IODO-, 7159
  - NEUTRONS
    - DOSE-RESPONSE STUDY, MOUSE, 6810*
  - OCCUPATIONAL HAZARD
    - COKE-OVENS, 7122
    - EPIDEMIOLOGY, 6670, 7122
    - EPIDEMIOLOGY, JAPAN, 7117
    - METALLURGY, 7117
  - PNEUMOTHORAX, ARTIFICIAL
    - EPIDEMIOLOGY, 7114
  - RADIATION, IONIZING
    - DOSE-RESPONSE STUDY, MOUSE, 6810*
  - SARCOMA
    - ACTINOMYCIN D, 6791*
    - BLEOMYCIN, 6791*
    - CYCLOPHOSPHAMIDE, 6791*
    - CYTOSINE, 1-BETA-D-ARABINOFURANOSYL-, 6791*
    - METHOTREXATE, 6791*
    - NEOPLASM METASTASIS, 6967
    - URACIL, 5-FLUORO-, 6791*
    - VINCALEUKOBLASTINE, 6791*
  - SARCOMA, OSTEOGENIC
    - NEOPLASM METASTASIS, REVIEW, 6649*
  - SCLERODERMA, SYSTEMIC
    - EPIDEMIOLOGY, REVIEW, 6625
  - SMOKING
    - EPIDEMIOLOGY, 7112
    - EPIDEMIOLOGY, REVIEW, 6656*
  - VINCALEUKOBLASTIN
    - NEOPLASM METASTASIS, 6791*
  - VINCALEUKOBLASTINE
    - NEOPLASM METASTASIS, 6791*

- LYASES
  - HEPATOMA
    - SUCCINATES, 7184
  - KIDNEY NEOPLASMS
    - SUCCINATES, 7184

- LYMPH NODES
  - VIRUS, HERPES SIMPLEX 1
    - LYMPHOCYTE TRANSFORMATION, 6872
  - VIRUS, HERPES SIMPLEX 2
    - LYMPHOCYTE TRANSFORMATION, 6872

- LYMPHOCYTE DEPLETION
  - LYMPHOMA
    - CASE REPORT, 7073*
    - T-LYMPHOCYTES, 7073*
  - RADIATION, IONIZING
    - PLANT AGGLUTININS, 6799

- LYMPHOCYTE TRANSFORMATION
  - LEUKEMIA, LYMPHOCYTIC
    - IMMUNOGLOBULINS, 6995
    - PLANT AGGLUTININS, 6995
    - ROSETTE FORMATION, 6995
    - ULTRASTRUCTURAL STUDY, REVIEW, 6630
  - LEUKEMIA, MYELOBLASTIC
    - IMMUNOGLOBULINS, 6995
    - PLANT AGGLUTININS, 6995
    - ROSETTE FORMATION, 6995
  - RADIATION, IONIZING
    - B-LYMPHOCYTES, 6799
  - VIRUS, EPSTEIN-BARR
    - PHOSPHONIC ACIDS, 6866
  - VIRUS, HERPES SIMPLEX 1
    - IMMUNITY, CELLULAR, 6872
    - LYMPH NODES, 6872
  - VIRUS, HERPES SIMPLEX 2
    - IMMUNITY, CELLULAR, 6872
    - LYMPH NODES, 6872

- LYMPHOCYTES
  - BENZO(A)PYRENE
    - DNA REPLICATION, 6751*
  - COLONIC NEOPLASMS
    - CARCINOMA, 6941*
  - HODGKIN'S DISEASE
    - HISTOLOGICAL STUDY, 7066*
  - LEUKEMIA, HAIRY CELL

    - ULTRASTRUCTURAL STUDY, 6998
  - LEUKEMIA, LYMPHOCYTIC
    - ANTIGENS, NEOPLASM, REVIEW, 6630
    - IMMUNE RESPONSE, REVIEW, 6630
  - LEUKEMIA, MYELOCYTIC
    - CELL DIFFERENTIATION, 6950*
  - T-LYMPHOCYTES
    - NEOPLASM METASTASIS, REVIEW, 6620
  - LYMPHOSARCOMA
    - ANTIGENS, NEOPLASM, 6927
    - IMMUNITY, CELLULAR, 6927
  - THYMOMA
    - INTRACELLULAR FLUID, 7200*
    - NUCLEAR MAGNETIC RESONANCE STUDY, 7200*
  - VIRUS, EPSTEIN-BARR
    - CELL TRANSFORMATION, NEOPLASTIC, 6906*
    - LEUKEMIA, LYMPHOCYTIC, 6906*
  - VIRUS, RNA TUMOR
    - VIRUS-LIKE PARTICLES, 6900*

- B-LYMPHOCYTES
  - AGE FACTORS
    - TOLERANCE INDUCTION, 6948*
  - ALLOANTIGENS
    - COMPLEMENT, 6931
    - IMMUNOGLOBULINS, FC, 6931
  - BREAST NEOPLASMS
    - NEOPLASM METASTASIS, 6930
  - CELL DIFFERENTIATION
    - COMPLEMENT, 6931
    - FETUS, MOUSE, 6949*
    - IMMUNOGLOBULINS, FC, 6931
  - ETHANOL, 2-MERCAPTO-
    - FETUS, MOUSE, 6949*
  - GASTROINTESTINAL NEOPLASMS
    - NEOPLASM METASTASIS, 6930
  - HEMOCYANIN
    - ANTIGEN-ANTIBODY REACTIONS, 6948*
    - TOLERANCE INDUCTION, 6948*
  - IGG
    - COMPLEMENT, 6931
    - IMMUNOGLOBULINS, FC, 6931, 6953*
  - IGM
    - COMPLEMENT, 6931
    - IMMUNOGLOBULINS, FC, 6931, 6953*
  - IMMUNOGLOBULINS, SURFACE
    - LIVER, FETUS, 6949*
    - VARIABLE REGION DETERMINANTS, 6951*
  - ISOANTIGENS
    - ANTIBODY FORMATION, 6942*
  - LEUKEMIA, LYMPHOCYTIC
    - ULTRASTRUCTURAL STUDY, REVIEW, 6630
  - LYMPHOMA
    - CLASSIFICATION, REVIEW, 6638
  - MYELOMA PROTEINS
    - BINDING, 6953*
    - VARIABLE REGION DETERMINANTS, 6951*
  - PHENOL, 2,4-DINITRO-
    - ANTIGEN-ANTIBODY REACTIONS, 6948*
    - TOLERANCE INDUCTION, 6948*
  - RADIATION, IONIZING
    - LIPOPOLYSACCHARIDES, 6799
    - LYMPHOCYTE TRANSFORMATION, 6799
    - PLANT AGGLUTININS, 6799
    - SPLEEN, MOUSE, 6799
  - SARCOMA, RETICULUM CELL
    - CLASSIFICATION, REVIEW, 6638
  - SKIN NEOPLASMS
    - NEOPLASM METASTASIS, 6930
  - UROGENITAL NEOPLASMS
    - NEOPLASM METASTASIS, 6930
  - VIRUS, LACTATE DEHYDROGENASE
    - ANTIBODY FORMATION, 6915*

- T-LYMPHOCYTES
  - ANTIBODY FORMATION
    - GRAFT VS HOST REACTION, 6942*
  - BENZENESULFONIC ACID
    - ISOBUTYRIC ACID, ALPHA-AMINO-, 6812*
  - BENZOIC ACID, 3,3'-DITHIOBIS-6-NITRO-
    - ISOBUTYRIC ACID, ALPHA-AMINO-, 6812*
  - BREAST NEOPLASMS
    - NEOPLASM METASTASIS, 6930
  - CELL TRANSFORMATION, NEOPLASTIC
    - IMMUNE RESPONSE, REVIEW, 6621
  - GASTROINTESTINAL NEOPLASMS
    - NEOPLASM METASTASIS, 6930
  - IMMUNITY, CELLULAR
    - LYMPHOCYTE CULTURE TEST, MIXED, 6947*
  - IMMUNOGLOBULINS, SURFACE
    - VARIABLE REGION DETERMINANTS, 6951*
  - INSULIN
    - ISOBUTYRIC ACID, ALPHA-AMINO-, 6812*
  - ISOANTIGENS
    - ANTIBODY FORMATION, 6942*
  - LEUKEMIA, LYMPHOCYTIC
    - HISTOCOMPATIBILITY ANTIGENS, 6929
    - ULTRASTRUCTURAL STUDY, REVIEW, 6630
  - LYMPHOCYTES
    - NEOPLASM METASTASIS, REVIEW, 6620
  - LYMPHOMA
    - ANTIGENS, NEOPLASM, 6928
    - CLASSIFICATION, REVIEW, 6638
    - IMMUNITY, CELLULAR, 6919
    - IMMUNITY, PASSIVE, 6919
    - LYMPHOCYTE DEPLETION, 7073*
  - MELANOMA
    - NEOPLASM METASTASIS, 6923
  - MYELOMA PROTEINS
    - VARIABLE REGION DETERMINANTS, 6951*
  - PACTAMYCIN•
    - DNA REPLICATION, 6947*
  - RADIATION, IONIZING
    - ALLOGENEIC SUPPRESSIVE FACTOR, 6943*
    - ISOBUTYRIC ACID, ALPHA-AMINO-, 6812*
    - LIPOPOLYSACCHARIDES, 6799
    - PLANT AGGLUTININS, 6799
    - SPLEEN, MOUSE, 6799
  - SARCOMA
    - NEOPLASM METASTASIS, REVIEW, 6620
  - SKIN NEOPLASMS
    - NEOPLASM METASTASIS, 6930
  - SPLEEN
    - ALLOGENEIC SUPPRESSIVE FACTOR, 6943*

- UROGENITAL NEOPLASMS
  - NEOPLASM METASTASIS, 6930
- VIRUS, MOLONEY MURINE SARCOMA
  - ANTILYMPHOCYTE SERUM, 6850
  - IMMUNITY, CELLULAR, 6850

LYMPHOCYTOSIS
- ERYTHROPLASIA
  - CASE REPORT, 7076*
- HEAVY CHAIN DISEASE
  - CASE REPORT, 7076*
- PARAPROTEINEMIAS
  - CASE REPORT, 7076*
  - IGM, 7076*

LYMPHOID TISSUE
- VIRUS, EPSTEIN-BARR
  - PRECANCEROUS CONDITIONS, 6868

LYMPHOMA (GENERAL AND UNSPECIFIED)
- SEE ALSO HODGKIN'S DISEASE/BURKITT'S LYMPHOMA/SARCOMA, RETICULUM CELL/LYMPHOSARCOMA
- ANTIGENS, NEOPLASM
  - IMMUNITY, PASSIVE, 6919
- BENZ(A)ANTHRACENE, 7,12-DIMETHYL-
  - CHROMOSOME ABNORMALITIES, 7085*
- BLOOD TRANSFUSION
  - EPIDEMIOLOGY, 7101
  - HORIZONTAL TRANSMISSION, 7101
- CELL LINE
  - MURAMIDASE, 7187
- CELLULAR INCLUSIONS
  - CASE REPORT, 7073*
- CHROMOSOME ABERRATIONS
  - REVIEW, 6650*
- CHROMOSOME ABNORMALITIES
  - PRECANCEROUS CONDITIONS, 7075*
- ETHYLENE, CHLORO- POLYMER
  - ENVIRONMENTAL HAZARD, 6735*
- FETAL HEMOGLOBIN
  - SERUM LEVELS, 7164
- HISTOCOMPATIBILITY ANTIGENS
  - TRANSPLANTATION IMMUNOLOGY, 6944*
- IMMUNITY, CELLULAR
  - XENOGENEIC ADOPTIVE TRANSFER, 6937*
- IMMUNOLOGIC DEFICIENCY SYNDROMES
  - CLASSIFICATION, REVIEW, 6638
- LYMPHOCYTE DEPLETION
  - CASE REPORT, 7073*
- B-LYMPHOCYTES
  - CLASSIFICATION, REVIEW, 6638
- T-LYMPHOCYTES
  - ANTIGENS, NEOPLASM, 6928
  - CLASSIFICATION, REVIEW, 6638
  - IMMUNITY, CELLULAR, 6919
  - IMMUNITY, PASSIVE, 6919
  - LYMPHOCYTE DEPLETION, 7073*
- NEOPLASM TRANSPLANTATION
  - DIFFUSION CHAMBERS, 6944*
- RADIATION, IONIZING
  - EPIDEMIOLOGY, CHILD, 6825*
- RUBELLA
  - LYMPHOCYTE DEPLETION, 7073*
- SCLERODERMA, SYSTEMIC
  - EPIDEMIOLOGY, REVIEW, 6625
- VIRUS, ABELSON MURINE LEUKEMIA
  - MURAMIDASE, 7187
- VIRUS, CYTOMEGALO
  - ANTIBODIES, VIRAL, 6867
- VIRUS, EPSTEIN-BARR
  - ANTIBODIES, VIRAL, 6867
  - ANTIGENS, VIRAL, 6867
- VIRUS, GROSS MURINE LEUKEMIA
  - IMMUNITY, CELLULAR, 6919, 6937*
  - IMMUNITY, PASSIVE, 6937*
- VIRUS, HERPES SAIMIRI
  - ANTIBODY FORMATION, 6914*
  - HISTOLOGICAL STUDY, RABBIT, 6914*
  - IMMUNE RESPONSE, 6914*
  - MARMOSETS, 6913*
- VIRUS, HERPES SIMPLEX 1
  - ANTIBODIES, VIRAL, 6867
- VIRUS, RADIATION LEUKEMIA
  - RADIATION, IONIZING, 6839
- VIRUS, VARICELLA ZOSTER
  - ANTIBODIES, VIRAL, 6867

LYMPHOMA, GIANT FOLLICULAR
- CHROMOSOMES, HUMAN, 13-15
  - CHROMOSOME ABNORMALITIES, 7060*

LYMPHOSARCOMA
- AMERICIUM
  - DOSE-RESPONSE STUDY, MOUSE, 6798
- ANTIGENS, NEOPLASM
  - LYMPHOCYTES, 6927
- CHROMOSOMES, HUMAN, 13-15
  - CHROMOSOME ABNORMALITIES, 7060*
- FISHES
  - HORIZONTAL TRANSMISSION, 7096*
  - ULTRASTRUCTURAL STUDY, 7096*
  - VIRUS-LIKE PARTICLES, 7096*
- HODGKIN'S DISEASE
  - ANTIGENIC DETERMINANTS, 6927
- IMMUNITY, CELLULAR
  - COLONY INHIBITION, 6927
- LYMPHOCYTES
  - IMMUNITY, CELLULAR, 6927
- NEPHROSIS
  - CASE REPORT, 6956
- OCCUPATIONAL HAZARD
  - EPIDEMIOLOGY, 7123
- RADIATION, IONIZING
  - DOSE-RESPONSE STUDY, 6842
- SARCOMA, RETICULUM CELL
  - ANTIGENIC DETERMINANTS, 6927

LYSOSOMES
- EPITHELIAL CELLS
  - MACROPHAGES, 7086*
  - ULTRASTRUCTURAL STUDY, 7086*

MACROGLOBULINEMIA
- AUTOIMMUNE DISEASES
  - ANTIGENS, 6946*
  - DNA REPLICATION, 6946*

MACROPHAGES
- BENZO(A)PYRENE
  - LACTATE DEHYDROGENASE, 6751*
- CELL LINE
  - MURAMIDASE, 7187
- CELL TRANSFORMATION, NEOPLASTIC
  - IMMUNE RESPONSE, REVIEW, 6621
- EPITHELIAL CELLS

        LYSOSOMES, 7086*
    GRANULOMA
        CELL DIFFERENTIATION, REVIEW, 6651*
    LEUKEMIA, MYELOCYTIC
        CELL DIFFERENTIATION, 6950*
    NEOPLASMS, EXPERIMENTAL
        CHEMOTAXIS, 6939*
    SARCOMA
        MIGRATION INHIBITORY FACTOR, 6918

MAGNESIUM
    VIRUS, AVIAN MYELOBLASTOSIS
        DNA REPLICATION, 6829

MALARIA
    BURKITT'S LYMPHOMA
        EPIDEMIOLOGY, REVIEW, 6615

MALATE DEHYDROGENASE
    AGING
        MITOCHONDRIA, LIVER, 7095*

MAMMARY NEOPLASMS, EXPERIMENTAL
    ACETAMIDE, N,N'-9H-FLUORENE-2,7-DIYLBIS-
        CARCINOGENIC ACTIVITY, 6679
    ADENOFIBROMA
        ASBESTOS, 6734*
    ANTIGENS, NEOPLASM
        ANTIBODY BINDING, 6954*
    BENZ(A)ANTHRACENE, 7,12-DIMETHYL-
        DNA REPLICATION, 6682
        ESTRADIOL, 6682, 6783*
        INSULIN, 6682
        PROGESTERONE, 6682
        PROLACTIN, 6682
    CARCINOMA
        ACETAMIDE, N,N'-9H-FLUORENE-2,7-DIYLBIS-, 6679
        IMMUNITY, CELLULAR, 6901*, 6933*
        TRANSPLANTATION, HOMOLOGOUS, 6933*
    CONTRACEPTIVES, ORAL
        CARCINOGENIC POTENTIAL, DOG, MONKEY, 6789*
    IMMUNOGLOBULINS, SURFACE
        ANTIGEN-ANTIBODY COMPLEX, 6954*
    OVALBUMIN
        ANTIGEN-ANTIBODY COMPLEX, 6954*
    PREGN-4-ENE-3,20-DIONE, 17-(ACETYLOXY)-6-METHYL-, (6ALPHA)-
        PRECANCEROUS CONDITIONS, DOG, 6785*
    RADIATION, IONIZING
        EPIDEMIOLOGY, RAT, 6809*
        GENETICS, 6809*
        NEOPLASM METASTASIS, 6804*, 6805*
        NEOPLASM TRANSPLANTATION, 6804*, 6805*
        STEROIDS, 6804*
    RECEPTORS, HORMONE
        ESTRADIOL, 6783*
    SERUM ALBUMIN, BOVINE
        ANTIGEN-ANTIBODY COMPLEX, 6954*

MANGANESE
    VIRUS, AVIAN MYELOBLASTOSIS
        DNA REPLICATION, 6829

MAXILLARY NEOPLASMS
    MYXOMA
        CASE REPORT, 6986
    ODONTOGENIC TUMOR
        CASE REPORT, 6986
        MYXOMA, 6986
        ULTRASTRUCTURAL STUDY, 6986

MEDIASTINAL NEOPLASMS
    CARCINOID TUMOR
        CASE REPORT, 7047*
        NEOPLASM METASTASIS, 7047*
    NEOPLASTIC ENDOCRINE-LIKE SYNDROMES
        BIOGENIC AMINES, 7047*

MEGAKARYOCYTES
    MYELOID METAPLASIA
        ULTRASTRUCTURAL STUDY, 7037*

MEIOSIS
    BREAST NEOPLASMS
        CELLS, CULTURED, 7162
    GYNECOLOGIC NEOPLASMS
        CELLS, CULTURED, 7162
    MELANOMA
        CELLS, CULTURED, 7162

MELANIN
    BRAIN NEOPLASMS
        CASE REPORT, 7052*
    MELANOMA
        CELL LINE, 7194*
    NEURILEMMOMA
        TRANSPLACENTAL CARCINOGENESIS, 6770*
    PHARYNGEAL NEOPLASMS
        CASE REPORT, 7052*

MELANOMA
    ANTIGEN-ANTIBODY REACTIONS
        IMMUNITY, CELLULAR, REVIEW, 6648*
    ANTIGENS, NEOPLASM
        IMMUNITY, CELLULAR, REVIEW, 6648*, 6935*
    AUTOANTIBODIES
        IMMUNITY, CELLULAR, REVIEW, 6648*
    BLOOD VESSELS
        MATHEMATICAL MODEL, CELL MIGRATION, 7155
    CELL DIFFERENTIATION
        PIGMENTATION, REVIEW, 6935*
        ULTRASTRUCTURAL STUDY, REVIEW, 6657*
    CELL LINE
        GLUCOSEPHOSPHATE DEHYDROGENASE, 7194*
        KARYOTYPING, 7194*
        MELANIN, 7194*
        PHOSPHOGLUCOMUTASE, 7194*
    CELLS, CULTURED
        DNA, 7162
        KARYOTYPING, 7162
        MEIOSIS, 7162
    DIPHENOL OXIDASES
        PIGMENTATION, REVIEW, 6935*
    GROWTH SUBSTANCES
        BLOOD VESSELS, 7155
    IMMUNITY, CELLULAR
        NEOPLASM METASTASIS, 6923

- IMMUNOGLOBULINS
  - ISOLATION AND CHARACTERIZATION, REVIEW, 6935*
- T-LYMPHOCYTES
  - NEOPLASM METASTASIS, 6923
- NEOPLASM CIRCULATING CELLS
  - NEOPLASM METASTASIS, 6923
- NEOPLASM METASTASIS
  - ENZYMATIC ACTIVITY, 7088*
- NEOPLASM TRANSPLANTATION
  - BLOOD VESSELS, 7155
- NEOPLASMS, CONNECTIVE TISSUE
  - ENZYMATIC ACTIVITY, 7088*
- NEOPLASMS, MULTIPLE PRIMARY
  - EPIDEMIOLOGY, TEXAS, 7124
- RACIAL FACTORS
  - EPIDEMIOLOGY, TEXAS, 7124
- RADIATION, IONIZING
  - NEOPLASM METASTASIS, 6923
- SEX FACTORS
  - EPIDEMIOLOGY, TEXAS, 7124
- SKIN NEOPLASMS
  - EPIDEMIOLOGY, 7133*
  - VIRUS, PAPOVA, 6902*
- TRANSPLANTATION, HETEROLOGOUS
  - NEOPLASM METASTASIS, 7194*
- TRANSPLANTATION, HOMOLOGOUS
  - NEOPLASM METASTASIS, 6923
- URIDINE, 5-BROMO-2'-DEOXY-
  - CARCINOGENIC EFFECT, 6633
  - CELLS, CULTURED, 6633
  - TRANSPLANTATION, HETEROLOGOUS, 7194*
  - VIRUS INDUCTION, 6633

MEMBRANE POTENTIALS
- BRAIN NEOPLASMS
  - CLONE CELLS, 6767*

MENINGIOMA
- BRAIN NEOPLASMS
  - EPIDEMIOLOGY, SOUTHWEST ASIA, 7130*
- NERVOUS SYSTEM NEOPLASMS
  - INCIDENCE RATES, MOUSE, 7145*

MENOPAUSE
- UTERINE NEOPLASMS
  - ESTRADIOL, 6786*
  - ESTRONE, 6786*

MESONEPHROMA
- OVARIAN NEOPLASMS
  - MUCOPOLYSACCHARIDES, 7025*

MESOTHELIOMA
- ASBESTOS
  - ENVIRONMENTAL HAZARD, 7139*
  - EPIDEMIOLOGY, 7121
  - EPIDEMIOLOGY, FINLAND, 7139*
  - OCCUPATIONAL HAZARD, 7139*
- OCCUPATIONAL HAZARD
  - EPIDEMIOLOGY, 6670
- PERITONEAL NEOPLASMS
  - EPIDEMIOLOGY, 6670
- PLEURAL NEOPLASMS
  - EPIDEMIOLOGY, 6670
  - EPIDEMIOLOGY, FINLAND, 7139*
  - FIBERGLASS, REVIEW, 6606
  - FOREIGN BODIES, REVIEW, 6606
- UTERINE NEOPLASMS
  - EPIDEMIOLOGY, 7000
  - HISTOLOGICAL STUDY, 7000

MESTRANOL
- ESTROGENS
  - UTERUS, MOUSE, 6898*
- VIRAL PROTEINS
  - UTERUS, MOUSE, 6898*

METALLURGY
- LUNG NEOPLASMS
  - OCCUPATIONAL HAZARD, 7117

METHANE, AZOXY-
- COLONIC NEOPLASMS
  - BACTERIA, 6703
  - RAT, GERM-FREE, 6703
- INTESTINAL NEOPLASMS
  - RAT, GERM-FREE, 6703

METHANE, DICHLORODIFLUORO-
- AIR POLLUTANTS
  - CHROMATOGRAPHIC ANALYSIS, 6737*

METHANE, IODO-
- AIR POLLUTANTS
  - CHROMATOGRAPHIC ANALYSIS, 6737*

METHANE, SULFINYLBIS-
- VIRUS, FRIEND MURINE LEUKEMIA
  - ERYTHROPOIESIS, 6837
  - HEMOGLOBINS, 6837
  - PENTOSEPHOSPHATES, 6836
  - PURINES, 6836

METHANE, TRICHLOROFLUORO-
- AIR POLLUTANTS
  - CHROMATOGRAPHIC ANALYSIS, 6737*

METHANESULFONIC ACID, ETHYL ESTER
- DNA
  - CARCINOGENIC POTENTIAL, 6713
- FIBROBLASTS
  - RNA POLYMERASE, 6667
- RNA POLYMERASE
  - ALPHA-AMANITIN RESISTANCE, 6667
- SARCOMA
  - ASPARAGINE REQUIREMENT, MUTATION, 6715

METHANESULFONIC ACID, METHYL ESTER
- DNA
  - CARCINOGENIC POTENTIAL, 6713

METHIONINE
- VIRUS, RAUSCHER MURINE LEUKEMIA
  - GLYCOPROTEINS, 6890*

METHOTREXATE
- LUNG NEOPLASMS
  - SARCOMA, 6791*
- PSORIASIS
  - CARCINOGENIC EFFECT, 6792*
  - MUTAGENIC EFFECT, 6792*

- METHYLGLYOXAL BIS(GUANYLHYDRAZONE) DIACETATE
  - FIBROBLASTS
    - DNA REPLICATION, 7177
  - SPERMIDINE
    - DNA REPLICATION, 7177
  - SPERMINE
    - DNA REPLICATION, 7177

- N-METHYL-N'-NITRO-N-NITROSOGUANIDINE
  - SEE GUANIDINE, 1-METHYL-3-NITRO-1-NITROSO-

- METHYL SULFOXIDE
  - SEE METHANE, SULFINYLBIS-

- 3-METHYLCHOLANTHRENE
  - SEE CHOLANTHRENE, 3-METHYL-

- MICROSOMES, LIVER
  - ANILINE
    - METABOLISM, 6750*
  - ANILINE, P-CHLORO-
    - CYTOCHROME P-450, 6690
  - ANILINE, 4,4'-SULFONYLDI-
    - CYTOCHROME P-450, 6690
  - BARBITURIC ACID,5-(1-CYCLOHEXEN-1-YL)-1,5-DIMETHYL-, SODIUM SALT
    - METABOLISM, 6750*
  - BENZENAMINE, N,N-DIMETHYL-4-((3-METHYLPHENYL)AZO)-
    - CYTOCHROME P-450, 6729*
    - NADH, NADPH OXIDOREDUCTASES, 6729*
    - OXIDOREDUCTASES, 6729*
  - BENZO(A)PYRENE
    - ARYL HYDROCARBON HYDROXYLASES,6757*
    - METABOLISM, 6699
    - POLYRIBONUCLEOTIDES, 6695
  - BENZO(A)PYRENE-4,5-OXIDE
    - EPOXIDE REDUCTION, 6691
  - CHOLANTHRENE, 3-METHYL-
    - ARYL HYDROCARBON HYDROXYLASES, 6757*
  - CORTISOL
    - CYTOCHROME P-450, 7190
  - CYTOCHROME REDUCTASES
    - METABOLISM, 6750*
    - PEROXIDASES, 6750*
  - DIET
    - CYTOCHROME REDUCTASES, 6750*
    - CYTOCHROMES, 6750*
    - OXYGENASES, 6750*
    - PEROXIDASES, 6750*
  - INDOLINE, 2-METHYL-
    - CYTOCHROME P-450, 6690
  - ISOTHIOCYANIC ACID, ETHYL ESTER
    - METABOLISM, 6750*
  - OXYGENASES
    - STRAIN DIFFERENCE, RAT, 6750*
  - PEROXIDASES
    - STRAIN DIFFERENCE, RAT, 6750*
  - SULFANILAMIDE
    - CYTOCHROME P-450, 6690
  - TILORONE
    - CYTOCHROME P-450, 6694
    - HYDROXYLASES, 6694
    - OXIDOREDUCTASES, 6694
  - VIRUS, MOLONEY MURINE LEUKEMIA
    - RNA, VIRAL, 6849
  - VITAMIN E
    - PEROXIDASES, 6750*

- MICROTUBULES
  - ANEMIA, APLASTIC
    - ERYTHROCYTES, 6961
  - BRAIN NEOPLASMS
    - CLONE CELLS, 6767*

- MIGRATION INHIBITORY FACTOR
  - SARCOMA
    - FIBROSARCOMA, 6918
    - HEPATOMA, 6918
    - MACROPHAGES, 6918
    - TERATOID TUMOR, 6918

- MITOCHONDRIA
  - ANEMIA, APLASTIC
    - ERYTHROCYTES, 6961
  - LEUKEMIA, MYELOCYTIC
    - ERYTHROCYTES, 6961
  - RETINOBLASTOMA
    - GENETICS, 6982

- MITOCHONDRIA, LIVER
  - AGING
    - CYTOCHROME OXIDASE, 7095*
    - MALATE DEHYDROGENASE, 7095*
    - ULTRASTRUCTURAL STUDY, 7095*

- MITOMYCIN C
  - BLADDER NEOPLASMS
    - FORMAMIDE, N-(4-(5-NITRO-2-FURYL)-2-THIAZOLYL)-, 6683
  - VIRUS, MOLONEY MURINE SARCOMA
    - LYMPHOCYTE CULTURE TEST, MIXED, 6850

- MITOSIS
  - ADENOCARCINOMA
    - CHALONES, 7157
  - CARCINOMA, EHRLICH TUMOR
    - IMMUNOSUPPRESSION, 7048*
    - TRANSPLANTATION, HETEROLOGOUS, 7048*
  - CARCINOMA, EPIDERMOID
    - CHALONES, 7157
  - FIBROBLASTS
    - AGING, 6855
  - MESENTERY
    - CELL PROLIFERATION, TISSUE MODEL, 7156
  - NEOPLASM METASTASIS
    - AGING, REVIEW, 6659*
  - NEOPLASMS
    - AGING, REVIEW, 6659*
  - RESPIRATORY TRACT NEOPLASMS
    - CHALONES, 7157
  - VIRUS, SV40
    - CELL TRANSFORMATION, NEOPLASTIC, 6855
    - ULTRASTRUCTURAL STUDY, 6855

- MIXED FUNCTION OXIDASE
  - SEE OXIDOREDUCTASES

- MONOAMINE OXIDASE
  - LEUKEMIA L1210
    - LIVER, 7189
  - SARCOMA

        - ASCITIC FLUID, 7189
        - LIVER, 7189

- MONOCYTES
    - LEUKEMIA, HAIRY CELL
        - CELL DIFFERENTIATION, 7070*
    - NEOPLASMS, EXPERIMENTAL
        - BENZ(A)ANTHRACENE, 7,12-DIMETHYL-, 6939*
        - PEPTONES, 6939*

- MORPHINE, ETHYL-
    - MICROSOMES, LIVER
        - METABOLISM, 6750*

- MOUTH NEOPLASMS
    - CARCINOMA, EPIDERMOID
        - EPIDEMIOLOGY, 7110
    - NEUROMA
        - NEOPLASMS, MULTIPLE PRIMARY, 7049*
    - OCCUPATIONAL HAZARD
        - COKE-OVENS, 7122
        - EPIDEMIOLOGY, 7122
    - ODONTOGENIC TUMOR
        - FISH, REVIEW, 6985
    - PAPILLOMA
        - FISH, REVIEW, 6985

- MUCIN
    - BREAST NEOPLASMS
        - CARCINOMA, 6972
        - CARCINOMA IN SITU, 6972
        - HISTOLOGICAL STUDY, LOBULAR TUMOR, 6972

- MUCOPOLYSACCHARIDES
    - NEOPLASMS, CONNECTIVE TISSUE
        - CELL TRANSFORMATION, NEOPLASTIC, REVIEW, 6660*
    - OVARIAN NEOPLASMS
        - CARCINOMA, MUCINOUS, 7025*
        - CARCINOMA, PAPILLARY, 7025*
        - DIAGNOSIS AND PROGNOSIS, 7025*
        - ENDOMETRIOSIS, 7025*
        - MESONEPHROMA, 7025*
    - VIRUS, POLYOMA
        - CELL TRANSFORMATION, NEOPLASTIC, 6864
        - HYALURONIDASE, 6864
    - VIRUS, ROUS SARCOMA
        - CELL TRANSFORMATION, NEOPLASTIC, 6864
        - HYALURONIDASE, 6864
    - VULVAR NEOPLASMS
        - PAGET'S DISEASE, EXTRA-MAMMARY, 7135*

- MULTIPLE MYELOMA
    - BLOOD TRANSFUSION
        - EPIDEMIOLOGY, 7101

- MULTIPLE SCLEROSIS
    - LEUKEMIA, MYELOBLASTIC
        - BUTYRIC ACID, 4-(P-(BIS(2-CHLOROETHYL)AMINO)PHENYL)-, 7079*

- MURAMIDASE
    - LEUKEMIA, MYELOCYTIC
        - CELL LINE, 7187
    - LYMPHOMA
        - CELL LINE, 7187
        - VIRUS, ABELSON MURINE LEUKEMIA, 7187
    - MACROPHAGES
        - CELL LINE, 7187
    - SARCOMA, RETICULUM CELL
        - CELL LINE, 7187

- MUTAGENS
    - VIRUS, HERPES SIMPLEX
        - THYMIDINE KINASE, 6870

- MUTATION
    - RADIATION, IONIZING
        - GRAFT REJECTION, 6823*
        - MUTAGENIC ACTIVITY, 6823*
    - RETINOBLASTOMA
        - CHROMOSOME ABERRATIONS, REVIEW, 6983

- MYCOBACTERIUM TUBERCULOSIS
    - GRANULOMA
        - HYPERSENSITIVITY, DELAYED, 6651*

- MYCOTOXINS
    - FOOD CONTAMINATION
        - PROTEIN CONCENTRATES, 6666

- MYELOFIBROSIS
    - VIRUS, C-TYPE RNA TUMOR
        - REVERSE TRANSCRIPTASE, REVIEW, 6875

- MYELOID METAPLASIA
    - BONE MARROW
        - ULTRASTRUCTURAL STUDY, 7037*
    - MEGAKARYOCYTES
        - ULTRASTRUCTURAL STUDY, 7037*

- MYELOMA
    - SEE MULTIPLE MYELOMA

- MYELOMA PROTEINS
    - B-LYMPHOCYTES
        - BINDING, 6953*
        - VARIABLE REGION DETERMINANTS, 6951*
    - T-LYMPHOCYTES
        - VARIABLE REGION DETERMINANTS, 6951*

- MYELOPROLIFERATIVE DISORDERS
    - LEUKEMIA
        - PRECANCEROUS CONDITIONS, REVIEW, 6628

- MYOBLASTOMA
    - LARYNGEAL NEOPLASMS
        - CARCINOMA, EPIDERMOID, 6990
        - CASE REPORT, 6990
        - SMOKING, 6990
        - ULTRASTRUCTURAL STUDY, 6990

- MYXOMA
    - MAXILLARY NEOPLASMS
        - CASE REPORT, 6986
        - ODONTOGENIC TUMOR, 6986

NAC
  ARYL HYDROCARBON HYDROXYLASES
    LIVER, RAT, 6748*

NADH, NADPH OXIDOREDUCTASES
  BENZENAMINE, N,N-DIMETHYL-4-((3-METHYLPHENYL)AZO)-
    MICROSOMES, LIVER, 6729*

NECK NEOPLASMS
  GOITER, NODULAR
    CASE REPORT, 7044*
  THYROID GLAND
    TISSUE, ABERRANT, 7044*

NECROSIS
  LIVER NEOPLASMS
    CADMIUM, 6779*
    TANNIC ACID, 6744*

NEOPLASM CIRCULATING CELLS
  MELANOMA
    NEOPLASM METASTASIS, 6923

NEOPLASM METASTASIS
  ANTIGENS, NEOPLASM
    REVIEW, 6658*
  BONE NEOPLASMS
    SARCOMA, OSTEOGENIC, 7039*
  BREAST NEOPLASMS
    B-LYMPHOCYTES, 6930
    T-LYMPHOCYTES, 6930
  CELL ADHESION
    REVIEW, 6658*
  CERVIX NEOPLASMS
    CARCINOMA, EPIDERMOID, 6974
    RADIOBIOLOGY, 6974
  COLONIC NEOPLASMS
    CARCINOMA, 6941*, 7091*
  CYCLOPHOSPHAMIDE
    LUNG NEOPLASMS, 7159
  GASTROINTESTINAL NEOPLASMS
    B-LYMPHOCYTES, 6930
    T-LYMPHOCYTES, 6930
  HEART NEOPLASMS
    DIETARY FATS, 6775*
    ESTRADIOL, 6775*
  KIDNEY NEOPLASMS
    CASE REPORT, 7034*
    LUNG NEOPLASMS, 7034*
  LIVER NEOPLASMS
    CARCINOEMBRYONIC ANTIGEN, 7082*
    GLUTAMYL TRANSPEPTIDASE, 7082*
    LACTATE DEHYDROGENASE, 7082*
  LUNG NEOPLASMS
    ACTINOMYCIN D, 6791*
    ANIMAL MODEL, RAT, 6967
    CARCINOMA, 7041*
    CORYNEBACTERIUM PARVUM, 7159
    CYCLOPHOSPHAMIDE, 6791*
    HEPARIN, 7159
    ISOPHOSPHAMIDE, 7159
    SARCOMA, 6967
    URIDINE, 2'-DEOXY-5-IODO-, 7159
  T-LYMPHOCYTES
    LYMPHOCYTES, 6620
  MAMMARY NEOPLASMS, EXPERIMENTAL
    RADIATION, IONIZING, 6804*, 6805*
  MEDIASTINAL NEOPLASMS
    CARCINOID TUMOR, 7047*
  MELANOMA
    ENZYMATIC ACTIVITY, 7088*
    IMMUNITY, CELLULAR, 6923
    T-LYMPHOCYTES, 6923
    NEOPLASM CIRCULATING CELLS, 6923
    RADIATION, IONIZING, 6923
    TRANSPLANTATION, HETEROLOGOUS, 7194*
    TRANSPLANTATION, HOMOLOGOUS, 6923
  MITOSIS
    AGING, REVIEW, 6659*
  NEOPLASMS, CONNECTIVE TISSUE
    REVIEW, 6658*
  NEUROBLASTOMA
    CHILD, 7015
  PEPTIDE HYDROLASES
    REVIEW, 6658*
  PROSTATIC NEOPLASMS
    SURGERY, OPERATIVE, 7030*
  SARCOMA
    ANIMAL MODEL, RAT, 6967
    IMMUNOSUPPRESSION, 6620
    T-LYMPHOCYTES, 6620
  SERUM GLOBULINS
    REVIEW, 6658*
  SKIN NEOPLASMS
    B-LYMPHOCYTES, 6930
    T-LYMPHOCYTES, 6930
  THYMUS NEOPLASMS
    CARCINOID TUMOR, 7047*
  THYROID NEOPLASMS
    CARCINOMA, 7041*
  UROGENITAL NEOPLASMS
    B-LYMPHOCYTES, 6930
    T-LYMPHOCYTES, 6930
  VIRUS-LIKE PARTICLES
    VERTICAL TRANSMISSION, HAMSTER, 7199*
  VULVAR NEOPLASMS
    PAGET'S DISEASE, EXTRA-MAMMARY, 7135*

NEOPLASM RECURRENCE, LOCAL
  BLADDER NEOPLASMS
    CHROMOSOME ABNORMALITIES, 6993
  VULVAR NEOPLASMS
    PAGET'S DISEASE, EXTRA-MAMMARY, 7135*

NEOPLASM TRANSPLANTATION
  FIBROSARCOMA
    ANTIBODY DISSOCIATION, 6924
  IMMUNOSUPPRESSION
    ISOANTIBODIES, 6924
  LYMPHOMA
    DIFFUSION CHAMBERS, 6944*
  MAMMARY NEOPLASMS, EXPERIMENTAL
    RADIATION, IONIZING, 6804*, 6805*
  MELANOMA
    BLOOD VESSELS, 7155
  SARCOMA
    IMMUNITY, CELLULAR, 6940*
  SKIN NEOPLASMS
    CARCINOMA, MUCINOUS, 6973
    FISHES, 7151*
    UTEROSTOMY, 6973

- NEOPLASMS, CONNECTIVE TISSUE
  - BLOOD VESSELS
    - CELL TRANSFORMATION, NEOPLASTIC, REVIEW, 6660*
  - COLLAGEN
    - CELL TRANSFORMATION, NEOPLASTIC, REVIEW, 6660*
  - MELANOMA
    - ENZYMATIC ACTIVITY, 7088*
  - MUCOPOLYSACCHARIDES
    - CELL TRANSFORMATION, NEOPLASTIC, REVIEW, 6660*
  - NEOPLASM METASTASIS
    - REVIEW, 6658*

- NEOPLASMS, EMBRYONAL AND MIXED
  - CLONE CELLS
    - CARCINOGENIC POTENTIAL, 7152
  - COLCHICINE, N-DEACETYL-N-METHYL-
    - CELL DIFFERENTIATION, 7152
    - CHROMOSOME ABNORMALITIES, 7152
  - CYTOCHALASIN B
    - CELL DIFFERENTIATION, 7152
    - CHROMOSOME ABNORMALITIES, 7152
  - HYBRID CELLS
    - CELL DIFFERENTIATION, 7152
  - OVARIAN NEOPLASMS
    - CHOLESTEROL, URINARY, 7003

- NEOPLASMS, EXPERIMENTAL
  - BENZ(A)ANTHRACENE, 7,12-DIMETHYL-
    - CHEMOTAXIS, 6939*
    - MONOCYTES, 6939*
  - BLOOD VESSELS
    - CELL DIFFERENTIATION, REVIEW, 6635
  - CELL DIFFERENTIATION
    - ULTRASTRUCTURAL STUDY, REVIEW, 6657*
  - GROWTH SUBSTANCES
    - ISOLATION AND CHARACTERIZATION, REVIEW, 6635
  - HYBRID CELLS
    - KARYOTYPING, 6663*
    - REVIEW, 6663*
  - MACROPHAGES
    - CHEMOTAXIS, 6939*
  - PEPTONES
    - MONOCYTES, 6939*
  - PROPYLAMINE, N-NITROSO-BIS(2-ACETOXY)-
    - DOSE-RESPONSE STUDY, 6680

- NEOPLASMS (GENERAL AND UNSPECIFIED)
  - SEE ALSO UNDER PARTICULAR SITE
  - AGE FACTORS
    - SPORTS, 6703
  - BODY HEIGHT
    - SPORTS, 6703
  - BODY WEIGHT
    - SPORTS, 6703
  - CARCINOGEN, ENVIRONMENTAL
    - REVIEW, 6661*
  - CELL DIFFERENTIATION
    - AGING, REVIEW, 6659*
  - EPIDEMIOLOGY
    - GERMANY, 7127*
    - REVIEW, 6661*
  - HORMONES
    - ULTRASTRUCTURAL STUDY, 7010
  - ISONICOTINIC ACID HYDRAZIDE
    - TUBERCULOSIS, 6706
  - MITOSIS
    - AGING, REVIEW, 6659*
  - RUBBER INDUSTRY
    - EPIDEMIOLOGY, 7123
  - SPORTS
    - EPIDEMIOLOGY, 6703
  - STRESS, PSYCHOLOGICAL
    - REVIEW, 6609
  - VIRUS, RNA TUMOR
    - VIRUS-LIKE PARTICLES, 6900*

- NEOPLASMS, MULTIPLE PRIMARY
  - BLADDER NEOPLASMS
    - EPIDEMIOLOGY, 7103
  - BREAST NEOPLASMS
    - CARCINOMA, SCIRRHOUS, 7004
    - EPIDEMIOLOGY, 7103
    - HISTOLOGICAL STUDY, 7004
    - HYPERPLASIA, 7004
  - BRONCHIAL NEOPLASMS
    - EPIDEMIOLOGY, 7103
  - FALLOPIAN TUBE NEOPLASMS
    - CARCINOMA, TRANSITIONAL CELL, 6968
    - CASE REPORT, 6968
  - INCIDENCE RATES
    - IMMUNE RESPONSE, 7134*
  - LARYNGEAL NEOPLASMS
    - CASE REPORT, 6990
    - NEUROMA, 7049*
  - LEUKEMIA, LYMPHOCYTIC
    - IMMUNE RESPONSE, 7134*
  - LIP NEOPLASMS
    - NEUROMA, 7049*
  - MELANOMA
    - EPIDEMIOLOGY, TEXAS, 7124
  - MOUTH NEOPLASMS
    - NEUROMA, 7049*
  - NEUROMA
    - CASE REPORT, 7049*
  - OVARIAN NEOPLASMS
    - ADENOCARCINOMA, 6968
    - ENDOMETRIOSIS, 6968
  - PARAGANGLIOMA
    - CASE REPORT, 7045*
  - UTERINE NEOPLASMS
    - ADENOCARCINOMA, 6968
    - EPIDEMIOLOGY, 7103

- NEOPLASMS, MUSCLE TISSUE
  - LEIOMYOSARCOMA
    - ASBESTOS, 7035*
    - CASE REPORT, 7035*
    - ULTRASTRUCTURAL STUDY, 7035*

- NEOPLASMS, VASCULAR TISSUE
  - ANGIOSARCOMA
    - HYDRAZINE, 1,1,2-TRIMETHYL-, HYDROCHLORIDE, 6740*
  - SCLERODERMA, SYSTEMIC
    - EPIDEMIOLOGY, REVIEW, 6625

- NEOPLASTIC ENDOCRINE-LIKE SYNDROMES
  - MEDIASTINAL NEOPLASMS
    - BIOGENIC AMINES, 7047*
  - PARAGANGLIOMA
    - CASE REPORT, 7045*
  - THYMUS NEOPLASMS
    - BIOGENIC AMINES, 7047*

- NEPHROBLASTOMA
  - CELL DIFFERENTIATION
    - TRANSPLANTATION, EMBRYONAL TISSUE, 7033*
  - UREA, ETHYL NITROSO-
    - DOSE-RESPONSE STUDY, 6769*
    - TRANSPLACENTAL CARCINOGENESIS, RABBIT, 6769*

- NEPHROSCLEROSIS
  - RADIATION, IONIZING
    - RADIATION CHIMERA, 6822*

- NEPHROSIS
  - LYMPHOSARCOMA
    - CASE REPORT, 6956

- NERVOUS SYSTEM DISEASES
  - VIRUS, VISNA
    - REVIEW, 6618

- NERVOUS SYSTEM NEOPLASMS
  - ASTROCYTOMA
    - INCIDENCE RATES, MOUSE, 7145*
  - ETHYLENE, CHLORO- POLYMER
    - ENVIRONMENTAL HAZARD, 6735*
  - GLIOMA
    - INCIDENCE RATES, MOUSE, 7145*
  - LEAD
    - OCCUPATIONAL HAZARD, 7118
  - MENINGIOMA
    - INCIDENCE RATES, MOUSE, 7145*
  - OLIGODENDROGLIOMA
    - INCIDENCE RATES, MOUSE, 7145*

- NEURAMINIDASE
  - ISOANTIGENS
    - S-49 CELLS, 6945*
  - VIRUS, ROUS SARCOMA
    - BINDING, 6877*

- NEURILEMMOMA
  - BRAIN NEOPLASMS
    - EPIDEMIOLOGY, SOUTHWEST ASIA, 7130*
  - MELANIN
    - TRANSPLACENTAL CARCINOGENESIS, 6770*
  - UREA, ETHYL NITROSO-
    - TRANSPLACENTAL CARCINOGENESIS, 6770*
    - ULTRASTRUCTURAL STUDY, 6770*

- NEUROBLASTOMA
  - ANTIGENS, NEOPLASM
    - CELL MEMBRANE, 7141*
  - CELL DIFFERENTIATION
    - CHILD, 7015
  - CHILD
    - CASE REPORT, 7015
  - EPIDEMIOLOGY
    - CHILD, 7015
    - HISTOPATHOLOGIC STUDY, 7015
  - GENETICS
    - CASE REPORT, 7053*
  - HISTOCOMPATIBILITY ANTIGENS
    - CELL MEMBRANE, 7141*
  - NEOPLASM METASTASIS
    - CHILD, 7015

- NEUROEPITHELIOMA
  - CELLULAR INCLUSIONS
    - ULTRASTRUCTURAL STUDY, 7163
  - NOSE NEOPLASMS
    - CASE REPORT, 7163
    - ULTRASTRUCTURAL STUDY, 7163

- NEUROMA
  - LARYNGEAL NEOPLASMS
    - NEOPLASMS, MULTIPLE PRIMARY, 7049*
  - LIP NEOPLASMS
    - NEOPLASMS, MULTIPLE PRIMARY, 7049*
  - MOUTH NEOPLASMS
    - NEOPLASMS, MULTIPLE PRIMARY, 7049*
  - NEOPLASMS, MULTIPLE PRIMARY
    - CASE REPORT, 7049*
  - THYROID NEOPLASMS
    - DIAGNOSIS AND TREATMENT, REVIEW, 6639
  - TRIAZENE, 3,3-DIETHYL-1-(M-PYRIDYL)-
    - CARCINOGENIC ACTIVITY, 6705
  - TRIAZENE, 3,3-DIETHYL-1-PHENYL-
    - CARCINOGENIC ACTIVITY, 6705

- NEUTRONS
  - LEUKEMIA
    - DOSE-RESPONSE STUDY, MOUSE, 6810*
  - LIVER NEOPLASMS
    - DOSE-RESPONSE STUDY, MOUSE, 6810*
  - LUNG NEOPLASMS
    - DOSE-RESPONSE STUDY, MOUSE, 6810*
  - SARCOMA, RETICULUM CELL
    - DOSE-RESPONSE STUDY, MOUSE, 6810*

- NEUTROPHILS
  - ANEMIA, APLASTIC
    - CYTOCHEMICAL STUDY, 7064*
    - PEROXIDASES, 7064*
    - ULTRASTRUCTURAL STUDY, 7064*
  - LEUKEMIA
    - PRECANCEROUS CONDITIONS, 7064*
  - LEUKEMIA, MYELOBLASTIC
    - MATHEMATICAL MODEL, 7193*

- NEVUS, PIGMENTED
  - LEUKEMIA, LYMPHOBLASTIC
    - PRECANCEROUS CONDITIONS, 7063*
  - RHABDOMYOSARCOMA
    - PRECANCEROUS CONDITIONS, 7063*

- NICKEL SULFIDE
  - RHABDOMYOSARCOMA
    - DNA REPLICATION, 7161

- NICOTINAMIDE
  - ISLET CELL TUMOR
    - INSULIN, 6726*

- NITROGEN
  - CELL TRANSFORMATION, NEOPLASTIC
    - METABOLISM, REVIEW, 6653*
  - GASTRECTOMY
    - METABOLISM, REVIEW, 6653*

- NORGESTREL
  - AFLATOXIN B1
    - FATTY LIVER, 6669
    - GLUTATHIONE, 6669
    - HEPATOTOXICITY, RAT, 6669

  - OXIDOREDUTASES, N-DEMETHYLATING, 6669
- ESTRADIOL
  - SERUM LEVELS, 6788*
- FSH
  - SERUM LEVELS, 6788*
- LH
  - SERUM LEVELS, 6788*
- PROGESTERONE
  - SERUM LEVELS, 6788*

NOSE NEOPLASMS
- ADENOCARCINOMA
  - OCCUPATIONAL HAZARD, 7115
- NEUROEPITHELIOMA
  - CASE REPORT, 7163
  - ULTRASTRUCTURAL STUDY, 7163
- POLYPS
  - ULTRASTRUCTURAL STUDY, 6987
- WOOD
  - DUST, 7115
  - OCCUPATIONAL HAZARD, 7115

NUCLEIC ACIDS
- CADMIUM
  - LIVER, RAT, 6779*
- DIMETHYLAMINE, N-NITROSO-
  - CARCINOGENIC ACTIVITY, 6710
  - GUANINE, 6710
- KIDNEY NEOPLASMS
  - VIRUS, LEOPARD FROG CARCINOMA, 7196*
- TURBELLARIA
  - CELL TRANSFORMATION, NEOPLASTIC, 7097*

NUCLEOPROTEINS
- ACETAMIDE, N-(ACETYLOXY)-N-9H-FLUOREN-2-YL-
  - DNA REPAIR, 6795
- BENZENAMINE, N,N-DIMETHYL-4-((3-METHYLPHENYL)AZO)-
  - CELL TRANSFORMATION, NEOPLASTIC, 6687
  - LIVER, RAT, 6677, 6687
- ULTRAVIOLET RAYS
  - DNA REPAIR, 6795
- VIRUS, POLYOMA
  - DNA REPLICATION, 6862

NUCLEOTIDYLTRANSFERASES
- LEUKEMIA, LYMPHOBLASTIC
  - CELL DIFFERENTIATION, REVIEW, 6616

OCCUPATIONAL HAZARD
- ASBESTOS
  - PARTICLE SIZE, ULTRASTRUCTURAL STUDY, 7119, 7148*
  - THRESHOLD LIMIT VALUES, 7121
- ASBESTOSIS
  - EPIDEMIOLOGY, 7121
- BLADDER NEOPLASMS
  - EPIDEMIOLOGY, 7123
- CARCINOGEN, CHEMICAL
  - RISK EVALUATION PROGRAM, 6601
- CARCINOGEN, ENVIRONMENTAL
  - EPIDEMIOLOGY, REVIEW, 6656*
- CARCINOMA, BRONCHOGENIC
  - EPIDEMIOLOGY, MONTANA, 7144*
- DIGESTIVE SYSTEM NEOPLASMS
  - LEAD, 7118
- ETHYLENE, CHLORO-
  - CHROMOSOME ABERRATIONS, 6671
- GASTROINTESTINAL NEOPLASMS
  - COKE-OVENS, 7122
  - EPIDEMIOLOGY, 6670, 7122, 7123
- HODGKIN'S DISEASE
  - EPIDEMIOLOGY, 7123
- KIDNEY NEOPLASMS
  - LEAD, 7118
- LEUKEMIA
  - EPIDEMIOLOGY, 7123
- LUNG NEOPLASMS
  - COKE-OVENS, 7122
  - EPIDEMIOLOGY, 6670, 7122
  - EPIDEMIOLOGY, JAPAN, 7117
  - METALLURGY, 7117
- LYMPHOSARCOMA
  - EPIDEMIOLOGY, 7123
- MESOTHELIOMA
  - ASBESTOS, 7139*
  - EPIDEMIOLOGY, 6670
- MOUTH NEOPLASMS
  - COKE-OVENS, 7122
  - EPIDEMIOLOGY, 7122
- NERVOUS SYSTEM NEOPLASMS
  - LEAD, 7118
- NOSE NEOPLASMS
  - ADENOCARCINOMA, 7115
  - WOOD, 7115
- PROSTATIC NEOPLASMS
  - EPIDEMIOLOGY, 7120, 7123
- RESPIRATORY TRACT NEOPLASMS
  - ASBESTOS, 7119
  - EPIDEMIOLOGY, 7116, 7119, 7120
  - LEAD, 7118
  - URANIUM, 7116

ODONTOGENIC TUMOR
- FIBROSARCOMA
  - CASE REPORT, 7040*
- MAXILLARY NEOPLASMS
  - CASE REPORT, 6986
  - MYXOMA, 6986
  - ULTRASTRUCTURAL STUDY, 6986
- MOUTH NEOPLASMS
  - FISH, REVIEW, 6985
- SARCOMA
  - CASE REPORT, 7040*
- ULTRASTRUCTURAL STUDY
  - CASE REPORT, 7040*

OLIGODENDROGLIOMA
- BRAIN NEOPLASMS
  - CASE REPORT, 7050*
  - GLIOBLASTOMA MULTIFORME, 7050*
- NERVOUS SYSTEM NEOPLASMS
  - INCIDENCE RATES, MOUSE, 7145*

OLIGONUCLEOTIDES
- VIRUS, ROUS SARCOMA
  - REPLICATION-DEFECTIVE DELETION MUTANTS, 6876*
  - RNA, VIRAL, 6876*

ONCOGENIC VIRUSES
- DNA POLYMERASE
  - MOLECULAR PROBES, 6622

- DNA REPAIR
  - CELL TRANSFORMATICN, NEOPLASTIC, REVIEW, 6634
- RADIATION, IONIZING
  - CELL TRANSFORMATION, NEOPLASTIC, REVIEW, 6634
- REVERSE TRANSCRIPTASE
  - RNA, 6645*

OUABAIN
- POTASSIUM
  - CELL TRANSFORMATION, NEOPLASTIC, 7158

OVALBUMIN
- MAMMARY NEOPLASMS, EXPERIMENTAL
  - ANTIGEN-ANTIBODY COMPLEX, 6954*

OVARIAN NEOPLASMS
- ADENOCARCINOMA
  - CHOLESTEROL, URINARY, 7003
  - NEOPLASMS, MULTIPLE PRIMARY, 6968
- ANTIGENS, NEOPLASM
  - ISOLATION AND CHARACTERIZATION, 6926
- ATAXIA TELANGIECTASIA
  - CASE REPORT, 7026*
- CARCINOMA
  - EPIDEMIOLOGY, 7002
- CARCINOMA, EPIDERMOID
  - ANTIGENS, NEOPLASM, 6926
- CARCINOMA, MUCINOUS
  - MUCOPOLYSACCHARIDES, 7025*
  - ULTRASTRUCTURAL STUDY, 6969
- CARCINOMA, PAPILLARY
  - MUCOPOLYSACCHARIDES, 7025*
- CYSTADENOCARCINOMA
  - ANTIGENS, NEOPLASM, 6926
- CYSTADENOMA, MUCINOUS
  - ANTIGENS, NEOPLASM, 6926
  - CHOLESTEROL, URINARY, 7003
- CYSTADENOMA, PAPILLARY
  - CASE REPORT, 7027*
  - CHOLESTEROL, URINARY, 7003
- DISGERMINOMA
  - CHOLESTEROL, URINARY, 7003
- ENDOMETRIOSIS
  - CHOLESTEROL, URINARY, 7003
  - MUCOPOLYSACCHARIDES, 7025*
  - NEOPLASMS, MULTIPLE PRIMARY, 6968
- FIBROSARCOMA
  - CASE REPORT, 7027*
- GRANULOSA CELL TUMOR
  - CHOLESTEROL, URINARY, 7003
- IODINE RADIOISOTOPES
  - ANTI-NEOPLASTIC ACTIVITY, MOUSE, 6818*
  - URIDINE, 2'-DEOXY-5-IODO-, 6818*
- MESONEPHROMA
  - MUCOPOLYSACCHARIDES, 7025*
- MUCOPOLYSACCHARIDES
  - DIAGNOSIS AND PROGNOSIS, 7025*
- NEOPLASMS, EMBRYONAL AND MIXED
  - CHOLESTEROL, URINARY, 7003
- PRECANCEROUS CONDITIONS
  - EPIDEMIOLOGY, 7002
- TERATOID TUMOR
  - EPIDEMIOLOGY, 7002
- URIDINE, 2'-DEOXY-5-IODO-
  - ANTI-NEOPLASTIC ACTIVITY, MOUSE, 6818*
- WERNER'S SYNDROME
  - CASE REPORT, 7027*

OVUM
- VIRUS, RAUSCHER MURINE LEUKEMIA
  - RNA REPLICATION, 6888*

OXIDOREDUCTASES
- BENZENAMINE, N,N-DIMETHYL-4-((3-METHYLPHENYL)AZO)-
  - ANILINE, 6729*
  - ANILINE, P-CHLORO-, 6729*
  - ANISOLE, P-NITRO-, 6729*
  - MICROSOMES, LIVER, 6729*
- BUTYRIC ACID, 2-AMINO-4-(ETHYLTHIO)-
  - CELL MEMBRANE, 6741*
- CHOLANTHRENE, 3-METHYL-
  - CELL TRANSFORMATION, NEOPLASTIC, 6692
  - CYTOCHROME P-450, 6692
- HYPERCHOLESTEREMIA
  - FIBROBLASTS, 6911*
- SARCOMA
  - CHOLANTHRENE, 3-METHYL-, 6692
- TILORONE
  - MICROSOMES, LIVER, 6694
- VIRUS, SV40
  - CELL TRANSFORMATION, NEOPLASTIC, 6911*

OXIDOREDUTASES, N-DEMETHYLATING
- AFLATOXIN B1
  - NORGESTREL, 6669

OXYGENASES
- BENZO(A)PYRENE
  - ENZYMATIC ACTIVITY, 6696
- CYTOCHROME P-450
  - BENZO(A)PYRENE, 6696
  - ENZYMATIC ACTIVITY, 6696
- MICROSOMES, LIVER
  - DIET, 6750*
  - STRAIN DIFFERENCE, RAT, 6750*

OXYMETHOLONE
- LEUKEMIA, MYELOBLASTIC
  - DNA REPLICATION, 7178
- LEUKEMIA, MYELOCYTIC
  - DNA REPLICATION, 7178

PACTAMYCIN
- DNA REPLICATION
  - IMMUNITY, CELLULAR, 6947*
- T-LYMPHOCYTES
  - DNA REPLICATION, 6947*

PAGET'S DISEASE, EXTRA-MAMMARY
- VULVAR NEOPLASMS
  - EPIDEMIOLOGY, 7135*
  - MUCOPOLYSACCHARIDES, 7135*
  - NEOPLASM METASTASIS, 7135*
  - NEOPLASM RECURRENCE, LOCAL, 7135*

PALMITIC ACID
- WATER POLLUTANTS
  - ISOLATION AND CHARACTERIZATION, 7150*

PANCREATIC NEOPLASMS
    ADENOCARCINOMA
        CASE REPORT, 7074*
        PROPYLAMINE, 2-HYDROXY-N-NITROSOBIS-, 6684
    ADENOMA
        PROPYLAMINE, 2-HYDROXY-N-NITROSOBIS-, 6684
    CARCINOMA
        GENETICS, 7074*
    CARCINOMA, DUCTAL
        PROPYLAMINE, 2-HYDROXY-N-NITROSOBIS-, 6684
    CARCINOMA, MUCINOUS
        CASE REPORT, 7074*
    GENETICS
        CASE REPORT, 7074*
    ISLET CELL TUMOR
        CASE REPORT, 7089*
        GASTRIN, 7089*
    PROPYLAMINE, 2-HYDROXY-N-NITROSOBIS-
        ULTRASTRUCTURAL STUDY, 6684
    PROPYLAMINE, N-NITROSO-BIS(2-ACETOXY)-
        HISTOLOGICAL STUDY, HAMSTER, 6680
    ZOLLINGER-ELLISON SYNDROME
        GASTRIN, 7089*

PAPILLOMA
    BLADDER NEOPLASMS
        1-BUTANOL, 4-(BUTYLNITROSAMINO)-, 7031*
    BREAST NEOPLASMS
        DIABETES MELLITUS, 7136*
    EELS
        ETIOLOGY, REVIEW, 7146*
        INCIDENCE RATES, EUROPE, 7146*
        VIRUS-LIKE PARTICLES, REVIEW, 7146*
    MOUTH NEOPLASMS
        FISH, REVIEW, 6985
    TRACHEAL NEOPLASMS
        DIETHYLAMINE, N-NITROSO-, 7094*
    UROGENITAL NEOPLASMS
        EPIDEMIOLOGY, 7032*
        URINARY TRACT INFECTIONS, 7032*
        UROLOGIC DISEASES, 7032*

PARAGANGLIOMA
    NEOPLASMS, MULTIPLE PRIMARY
        CASE REPORT, 7045*
    NEOPLASTIC ENDOCRINE-LIKE SYNDROMES
        CASE REPORT, 7045*

PARAPROTEINEMIAS
    LYMPHOCYTOSIS
        CASE REPORT, 7076*
        IGM, 7076*

PAROTID NEOPLASMS
    ACETAMIDE, N,N'-9H-FLUORENE-2,7-DIYLBIS-
        DOSE-RESPONSE STUDY, MOUSE, 6676
    QUINOLINE, 4-(HYDROXYAMINO)-, 1-OXIDE
        CARCINOGENIC POTENTIAL, 6711
    QUINOLINE, 4-NITRO-, 1-OXIDE
        CARCINOGENIC POTENTIAL, 6711

PENTOSEPHOSPHATES
    ERYTHROLEUKEMIA
        VIRUS, FRIEND MURINE LEUKEMIA, 6836
    VIRUS, FRIEND MURINE LEUKEMIA
        METHANE, SULFINYLBIS-, 6836

PEPTIDE HYDROLASES
    NEOPLASM METASTASIS
        REVIEW, 6658*

PEPTIDES
    HEPATOMA
        HYBRID CELLS, 7163
    L CELLS
        HYBRID CELLS, 7163
    VIRUS, MURINE MAMMARY TUMOR
        DNA NUCLEOTIDYLTRANSFERASES, 6893*
        TRYPSIN, 6892*
    VIRUS, RAUSCHER MURINE LEUKEMIA
        ANTIGENIC DETERMINANTS, 6888*
        ISOLATION AND CHARACTERIZATION, 6888*
        RNA REPLICATION, 6888*

PEPTONES
    NEOPLASMS, EXPERIMENTAL
        MONOCYTES, 6939*

PERITONEAL NEOPLASMS
    MESOTHELIOMA
        EPIDEMIOLOGY, 6670

PEROXIDASES
    ANEMIA, APLASTIC
        BACTERIA, 7064*
        NEUTROPHILS, 7064*
    LEUKEMIA
        PRECANCEROUS CONDITIONS, 7064*
    MICROSOMES, LIVER
        DIET, 6750*
        STRAIN DIFFERENCE, RAT, 6750*
        VITAMIN E, 6750*

PHAGOCYTES
    GRANULOMA
        CELL DIFFERENTIATION, REVIEW, 6651*

PHAGOCYTOSIS
    LEUKEMIA, HAIRY CELL
        CASE REPORT, 6997

PHARYNGEAL NEOPLASMS
    BRAIN NEOPLASMS
        CASE REPORT, 7052*
    CARCINOMA
        PRECANCEROUS CONDITIONS, 6989
    MELANIN
        CASE REPORT, 7052*

PHARYNX
    INFECTIOUS MONONUCLEOSIS
        VIRUS, EPSTEIN-BARR, 6908*

PHENOL, 2,4-DINITRO-
    B-LYMPHOCYTES
        ANTIGEN-ANTIBODY REACTIONS, 6948*
        TOLERANCE INDUCTION, 6948*

PHENOL, 2,4,6-TRICHLORO-
- WATER POLLUTANTS
  - ISOLATION AND CHARACTERIZATION, 7150*

PHEOCHROMOCYTOMA
- THYROID NEOPLASMS
  - DIAGNOSIS AND TREATMENT, REVIEW, 6639

PHORBOL MYRISTATE ACETATE
- SEE 12-O-TETRADECANOYLPHORBOL-13-ACETATE

PHOSPHATES
- CONTACT INHIBITION
  - METABOLISM, 3T3 CELLS, 7198*
- GROWTH SUBSTANCES
  - METABOLISM, 3T3 CELLS, 7198*

PHOSPHODIESTERASES
- ADENOSINE CYCLIC 3',5' MONOPHOSPHATE
  - RADIATION-PROTECTIVE AGENTS, 6806*
- HETEROXANTHINE, ISOBUTYL-
  - RADIATION-PROTECTIVE AGENTS, 6806*
- RADIATION, IONIZING
  - ADENOSINE CYCLIC 3',5' MONOPHOSPHATE, 6806*

PHOSPHOGLUCOMUTASE
- MELANOMA
  - CELL LINE, 7194*

PHOSPHONIC ACIDS
- VIRUS, EPSTEIN-BARR
  - ANTIGENS, VIRAL, 6866
  - DNA, VIRAL, 6866
  - LYMPHOCYTE TRANSFORMATION, 6866

PHOSPHORUS
- POLYCYTHEMIA VERA
  - BONE MARROW CELLS, 6959
  - HYPERPLASIA, 6959
  - PRECANCEROUS CONDITIONS, 6959

PHTHALIC ACID, BENZYL BUTYL ESTER
- WATER POLLUTANTS
  - ISOLATION AND CHARACTERIZATION, 7150*

PHTHALIC ANHYDRIDE
- WATER POLLUTANTS
  - ISOLATION AND CHARACTERIZATION, 7150*

PHYTOHEMAGGLUTININ
- SEE PLANT AGGLUTININS

PINEALOMA
- CYTOPLASM
  - VIRUS-LIKE PARTICLES, 6895*
- VIRUS, JC PAPOVA
  - CELL DIFFERENTIATION, 6903*
  - ULTRASTRUCTURAL STUDY, HAMSTER, 6903*
- VIRUS-LIKE PARTICLES
  - ULTRASTRUCTURAL STUDY, 6895*

PITUITARY NEOPLASMS
- ADENOMA
  - CLASSIFICATION, 7011
  - ULTRASTRUCTURAL STUDY, 7011
- ANILINE, 2,4,6-TRIMETHYL-
  - CORTICOTROPIN, 6733*
  - HORMONES, 6733*
  - PROLACTIN, 6733*
  - SOMATOTROPIN, 6733*
  - ULTRASTRUCTURAL STUDY, 6733*
- CELL LINE
  - HORMONES, 6733*
- EPIDEMIOLOGY
  - SOUTHWEST ASIA, 7130*

PLACENTA
- EXONUCLEASES
  - DNA REPAIR, 7183
  - ISOLATION AND CHARACTERIZATION, 7183
- RNA, TRANSFER
  - TYROSINE ISOACCEPTORS, 7172

PLANT AGGLUTININS
- AGING
  - IMMUNE RESPONSE, 6938*
- LEUKEMIA, LYMPHOCYTIC
  - IMMUNE RESPONSE, 6996
  - LYMPHOCYTE TRANSFORMATION, 6995
- LEUKEMIA, MYELOBLASTIC
  - CELL AGGREGATION, 7154
  - LYMPHOCYTE TRANSFORMATION, 6995
- RADIATION, IONIZING
  - LYMPHOCYTE DEPLETION, 6799
  - B-LYMPHOCYTES, 6799
  - T-LYMPHOCYTES, 6799
- VIRUS, RAUSCHER MURINE LEUKEMIA
  - ERYTHROCYTES, 6846

PLASMACYTOMA
- IMMUNOGLOBULINS, LIGHT CHAIN
  - RNA, MESSENGER, 7171
- REVERSE TRANSCRIPTASE
  - C-TYPE PARTICLES, 6874
  - ISOLATION AND CHARACTERIZATION, 6874
- RNA, MESSENGER
  - CELL CYCLE KINETICS, 7171
  - ISOLATION AND CHARACTERIZATION, 7171
- RNA, VIRAL
  - ISOLATION AND CHARACTERIZATION, 6874

PLEURAL NEOPLASMS
- MESOTHELIOMA
  - EPIDEMIOLOGY, 6670
  - EPIDEMIOLOGY, FINLAND, 7139*
  - FIBERGLASS, REVIEW, 6606
  - FOREIGN BODIES, REVIEW, 6606

PNEUMOTHORAX, ARTIFICIAL
- BREAST NEOPLASMS
  - EPIDEMIOLOGY, 7114
- LEUKEMIA
  - EPIDEMIOLOGY, 7114
- LUNG NEOPLASMS
  - EPIDEMIOLOGY, 7114
- STOMACH NEOPLASMS
  - EPIDEMIOLOGY, 7114

POLY A
  VIRUS, FROG 3
    CYTOPLASM, 6834
    RNA, MESSENGER, 6834
    VIRUS REPLICATION, 6834
  VIRUS, POLYOMA
    RNA, VIRAL, 6863
  VIRUS, VACCINIA
    RNA, MESSENGER, 6834

POLYAMINES
  FIBROBLASTS
    DNA REPLICATION, 7177

POLYCYCLIC HYDROCARBONS
  CARRIER PROTEINS
    LIVER, MOUSE, 6760*
  CELL MEMBRANE
    AZAGUANINE REISTANCE, REVIEW, 6641
    OUABAIN RESISTANCE, REVIEW, 6641
    TEMPERATURE RESISTANCE, REVIEW, 6641
  CELLS, CULTURED
    MUTAGENIC ACTIVITY, REVIEW, 6641
  DNA
    ALKALINE ELUTION ASSAY, 6713
    CARCINOGENIC POTENTIAL, 6713
  SMOKING
    COCARCINOGENIC ACTIVITY, 6681
    ISOLATION AND CHARACTERIZATION, 6681
  THEOPHYLLINE
    MUTAGENIC ACTIVITY, REVIEW, 6641

POLYCYTHEMIA VERA
  BONE MARROW CELLS
    PHOSPHORUS, 6959
  FETAL HEMOGLOBIN
    SERUM LEVELS, 7164
  HYPERPLASIA
    PHOSPHORUS, 6959
  PRECANCEROUS CONDITIONS
    PHOSPHORUS, 6959

POLYNUCLEOTIDES
  CELL DIFFERENTIATION
    REVIEW, 6640
  VIRUS, HAMSTER LEUKEMIA
    RNA, VIRAL, 6891*
  VIRUS, MURINE SARCOMA
    RNA, VIRAL, 6891*
  VIRUS, RAUSCHER MURINE LEUKEMIA
    RNA, VIRAL, 6891*

POLYPLOIDY
  VIRUS, SV40
    CELL TRANSFORMATION, NEOPLASTIC, 6881*

POLYPS
  COLONIC NEOPLASMS
    ISOANTIGENS, 7091*
  DUODENAL NEOPLASMS
    HYDRAZINE, 1,2-DIMETHYL-, 6739*, 7092*
    ULTRASTRUCTURAL STUDY, 7092*
  HYDRAZINE, 1,2-DIMETHYL-
    ULTRASTRUCTURAL STUDY, 6739*
  INTESTINAL NEOPLASMS
    HYDRAZINE, 1,2-DIMETHYL-, 6739*, 7092*
    ULTRASTRUCTURAL STUDY, 7092*
  NOSE NEOPLASMS
    ULTRASTRUCTURAL STUDY, 6987
  SPLENIC NEOPLASMS
    DIETHYLAMINE, N-NITROSO-, 7094*
  STOMACH NEOPLASMS
    UREA, METHYL NITROSO-, 6772*
  TRACHEAL NEOPLASMS
    DIETHYLAMINE, N-NITROSO-, 7094*

POLYRIBONUCLEOTIDES
  BENZO(A)PYRENE
    BINDING, COVALENT, 6695
    MICROSOMES, LIVER, 6695

POLYRIBOSOMES
  HEPATOMA
    RNA, MESSENGER, 7181

POTASSIUM
  ANTHRANILIC ACID, 4-CHLORO-N-FURFURYL-5-SULFAMOYL-
    CELL TRANSFORMATION, NEOPLASTIC, 7158
  OUABAIN
    CELL TRANSFORMATION, NEOPLASTIC, 7158
  VIRUS, SV40
    CELL TRANSFORMATION, NEOPLASTIC, 7158
    TRANSPORT, CELL MEMBRANE, 7158

POTASSIUM CHLORIDE
  VIRUS, AVIAN MYELOBLASTOSIS
    DNA REPLICATION, 6829

PRECANCEROUS CONDITIONS
  BILE DUCT NEOPLASMS
    DIETHYLAMINE, N-NITROSO-, 6707
  BREAST NEOPLASMS
    AGE FACTORS, 7005
    BLOOD SUGAR, 7136*
    CARCINOMA, 7020*, 7022*
    CARCINOMA IN SITU, 7136*
    CICATRIX, 7021*
    DIABETES MELLITUS, 7136*
    EPIDEMIOLOGY, 7105
    EPIDEMIOLOGY, WEST GERMANY, 7005
    GRANULOMA, 7136*
    LIPOMA, 7136*
    RADIOGRAPHIC STUDY, PARENCHYMA, 7104
    RISK FACTOR, CLASSIFICATION, 7104
    UTERINE NEOPLASMS, 6790*
  CARCINOMA
    EPITHELIAL CELLS, VOCAL CORDS, 6989
  CERVIX NEOPLASMS
    BENZO(A)PYRENE, 6976
    CARCINOMA, 7142*
  CHROMOSOME ABNORMALITIES
    LYMPHOMA, 7075*
  COLONIC NEOPLASMS
    COLITIS, ULCERATIVE, 7108
    ENTERITIS, REGIONAL, 7108
    EPIDEMIOLOGY, REVIEW, 6612
  DUODENAL NEOPLASMS

- GUANIDINE, 1-ETHYL-3-NITRO-1-NITROSO-, 7093*
- ESOPHAGEAL NEOPLASMS
  - EPIDEMIOLOGY, JAPAN, 7131*
  - HISTOLOGICAL STUDY, 7131*
- HEPATOMA
  - ACETAMIDE, N-FLUOREN-2-YLDI-, 6731*
  - AFLATOXIN B1, 6725*
  - LIVER CIRRHOSIS, 7109
- INTESTINAL NEOPLASMS
  - EPIDEMIOLOGY, 6614
  - REVIEW, 6614
- LARYNGEAL NEOPLASMS
  - CARCINOMA, 7042*
  - LARYNGITIS, 7042*
- LEUKEMIA
  - BONE MARROW CELLS, 6802
  - CHROMOSOME ABERRATIONS, 6802
  - DIAGNOSIS AND CLASSIFICATION, 7069*
  - DIAGNOSIS AND PROGNOSIS, REVIEW, 6613
  - DRUG THERAPY, 6613
  - EPIDEMIOLOGY, JAPAN, 7068*
  - HEMATOLOGIC DISEASES, 7068*
  - NEUTROPHILS, 7064*
  - PEROXIDASES, 7064*
  - RADIATION, 6613
  - RADIOACTIVE FALLOUT, 6802
  - REVERSE TRANSCRIPTASE, 7061*
  - VIRUS, RNA TUMOR, 6613
- LEUKEMIA, LYMPHOBLASTIC
  - CELL DOUBLING TIMES, 7098
  - HAMARTOMA, 7063*
  - NEVUS, PIGMENTED, 7063*
- LEUKEMIA, LYMPHOCYTIC
  - CELL DOUBLING TIMES, 7098
- LEUKEMIA, MYELOBLASTIC
  - BUTYRIC ACID, 4-(P-(BIS(2-CHLOROETHYL)AMINO)PHENYL)-, 7079*
  - CELL DIFFERENTIATION, 6994
  - CYCLOPHOSPHAMIDE, 7079*
  - DNA REPLICATION, 6994
  - ERYTHROPOIESIS, 6994
- LEUKEMIA, MYELOCYTIC
  - CELL DOUBLING TIMES, 7098
- LIVER NEOPLASMS
  - ACETAMIDE, N-FLUOREN-2-YL-, 6728*
  - DIMETHYLAMINE, N-NITROSO-, 6728*
- LUNG NEOPLASMS
  - DIETHYLAMINE, N-NITROSO-, 6709
- OVARIAN NEOPLASMS
  - EPIDEMIOLOGY, 7002
- PHARYNGEAL NEOPLASMS
  - CARCINOMA, 6989
- POLYCYTHEMIA VERA
  - PHOSPHORUS, 6959
- RECTAL NEOPLASMS
  - EPIDEMIOLOGY, REVIEW, 6612
  - VILLOUS TUMORS, 6654*
- RESPIRATORY TRACT NEOPLASMS
  - 7H-DIBENZO(C,G)CARBAZOLE, 6754*
- RHABDOMYOSARCOMA
  - HAMARTOMA, 7063*
  - NEVUS, PIGMENTED, 7063*
- STOMACH NEOPLASMS
  - CARCINOMA, 7107
- SUCRASE, 7017
- UTERINE NEOPLASMS
  - CARCINOMA, 7142*
  - ESTROGENS, 6790*
- VIRUS, EPSTEIN-BARR
  - LYMPHOID TISSUE, 6868
  - MARMOSETS, 6868

PREDNISOLONE
- LEUKEMIA, MYELOCYTIC
  - CELL DIFFERENTIATION, 6950*

PREDNISONE
- SARCOMA, KAPOSI'S
  - TRANSPLANTATION, HOMOLOGOUS, 6965

PREGN-4-ENE-3,20-DIONE, 17-(ACETYLOXY)-6-METHYL-, (6ALPHA)-
- MAMMARY NEOPLASMS, EXPERIMENTAL
  - PRECANCEROUS CONDITIONS, DOG, 6785*
- PROGESTERONE
  - PRECANCEROUS CONDITIONS, DOG, 6785*

PREGN-4-ENE-3,20-DIONE, 17-(ACETYLOXY)-6-METHYL-, (6 ALPHA)-
- VIRAL PROTEINS
  - UTERUS, MOUSE, 6898*

PROGESTERONE
- BENZ(A)ANTHRACENE, 7,12-DIMETHYL-
  - BINDING, UTERINE AND BREAST CYTOSOL, 6784*
  - DNA REPLICATION, 6682
- CARCINOMA, BRONCHOGENIC
  - CELLS, CULTURED, 7192
- CHORIOCARCINOMA
  - CELLS, CULTURED, 7192
- ESTRADIOL, 17ALPHA-ETHYNYL-
  - SERUM LEVELS, 6788*
- MAMMARY NEOPLASMS, EXPERIMENTAL
  - BENZ(A)ANTHRACENE, 7,12-DIMETHYL-, 6682
- NORGESTREL
  - SERUM LEVELS, 6788*
- PREGN-4-ENE-3,20-DIONE, 17-(ACETYLOXY)-6-METHYL-, (6ALPHA)-
  - PRECANCEROUS CONDITIONS, DOG, 6785*

PROLACTIN
- ADENOMA
  - ULTRASTRUCTURAL STUDY, 7046*
- ADENOMA, CHROMOPHOBE
  - ULTRASTRUCTURAL STUDY, 7046*
- BENZ(A)ANTHRACENE, 7,12-DIMETHYL-
  - DNA REPLICATION, 6682
- LIVER CIRRHOSIS
  - ETHYL ALCOHOL, 6642*
  - SULPIRIDE, 6642*
  - THYROTROPIN, 6642*
- MAMMARY NEOPLASMS, EXPERIMENTAL
  - BENZ(A)ANTHRACENE, 7,12-DIMETHYL-, 6682
- PITUITARY NEOPLASMS
  - ANILINE, 2,4,6-TRIMETHYL-, 6733*

- PROMETHIUM
  - CHROMOSOME ABERRATIONS
    - METABOLISM, HAMSTER, 6816*
  - RADIOISOTOPES
    - CHROMOSOME ABERRATIONS, 6816*
    - METABOLISM, HAMSTER, 6816*

- PRONASE
  - VIRUS, ROUS SARCOMA
    - BINDING, 6877*

- PROPYLAMINE, 2-HYDROXY-N-NITROSOBIS-
  - PANCREATIC NEOPLASMS
    - ADENOCARCINOMA, 6684
    - ADENOMA, 6684
    - CARCINOMA, DUCTAL, 6684
    - ULTRASTRUCTURAL STUDY, 6684

- PROPYLAMINE, N-NITROSO-BIS(2-ACETOXY)-
  - BLOOD
    - METABOLISM, HAMSTER, 6680
  - KIDNEY NEOPLASMS
    - HISTOLOGICAL STUDY, HAMSTER, 6680
  - NEOPLASMS, EXPERIMENTAL
    - DOSE-RESPONSE STUDY, 6680
    - HISTOLOGICAL STUDY, HAMSTER, 6680
  - PANCREATIC NEOPLASMS
    - HISTOLOGICAL STUDY, HAMSTER, 6680
  - RESPIRATORY TRACT NEOPLASMS
    - HISTOLOGICAL STUDY, HAMSTER, 6680

- PROSTATIC NEOPLASMS
  - ADENOCARCINOMA
    - TREATMENT AND PROGNOSIS, 7030*
  - CADMIUM
    - EPIDEMIOLOGY, 7120
  - CARCINOMA
    - TREATMENT AND PROGNOSIS, 7030*
  - OCCUPATIONAL HAZARD
    - EPIDEMIOLOGY, 7120, 7123
  - SPORTS
    - EPIDEMIOLOGY, 6703
  - SURGERY, OPERATIVE
    - NEOPLASM METASTASIS, 7030*

- PROTEINS
  - CADMIUM
    - LIVER, RAT, 6779*
  - CELL TRANSFORMATION, NEOPLASTIC
    - METABOLISM, REVIEW, 6653*

- PROTEOGLYCANS
  - CHONDROSARCOMA
    - CASE REPORT, 7165

- PSORIASIS
  - METHOTREXATE
    - CARCINOGENIC EFFECT, 6792*
    - MUTAGENIC EFFECT, 6792*

- PURINE, 6-((1-METHYL-4-NITROIMIDAZOL-5-YL) THIO)-
  - SARCOMA, KAPOSI'S
    - TRANSPLANTATION, HOMOLOGOUS, 6965

- PURINE-6-THIOL
  - LEUKEMIA, LYMPHOBLASTIC
    - IGM, 7077*

- PURINES
  - DNA
    - DEOXYRIBONUCLEASE, 6718
  - ERYTHROLEUKEMIA
    - VIRUS, FRIEND MURINE LEUKEMIA, 6836
  - VIRUS, FRIEND MURINE LEUKEMIA
    - AMMONIUM, 6836
    - GLUTAMINE, 6836
    - METHANE, SULFINYLBIS-, 6836

- PYRENE
  - DIBENZ(A,H)ANTHRACENE
    - RETENTION, MOUSE, HAMSTER, 6752*
  - LUNG
    - RETENTION, MOUSE, HAMSTER, 6752*

- PYRIMIDINES
  - DNA
    - EMBRYO, RAT, 7179

- QUINACRINE HYDROCHLORIDE
  - SARCOMA
    - ASPARAGINE REQUIREMENT, MUTATION, 6715

- QUINOLINE, 4-(HYDROXYAMINO)-, 1-OXIDE
  - PAROTID NEOPLASMS
    - CARCINOGENIC POTENTIAL, 6711

- QUINOLINE, 4-NITRO-, 1-OXIDE
  - ASCORBIC ACID
    - OXIDATION, 6777*
    - PEROXIDE FORMATION, 6777*
  - PAROTID NEOPLASMS
    - CARCINOGENIC POTENTIAL, 6711
  - RADIATION, IONIZING
    - DNA REPLICATION, 6776*

- RADIATION
  - CARCINOMA, EHRLICH TUMOR
    - CHROMOSOME ABERRATIONS, 6807*
  - LEUKEMIA
    - PRECANCEROUS CONDITIONS, 6613

- RADIATION CHIMERA
  - LEUKEMIA
    - RADIATION, IONIZING, 6822*
  - NEPHROSCLEROSIS
    - RADIATION, IONIZING, 6822*
  - RADIATION, IONIZING
    - DOSE-RESPONSE STUDY, 6822*
  - SARCOMA, RETICULUM CELL
    - RADIATION, IONIZING, 6822*
  - THYMOMA
    - RADIATION, IONIZING, 6822*

- RADIATION INJURIES, EXPERIMENTAL
  - TECHNETIUM
    - RADIOISOTOPES, 6817*

- RADIATION, IONIZING
  - ACTINOMYCIN D
    - CELL CYCLE KINETICS, HAMSTER OVARY, 6820*
  - ADENOSINE CYCLIC 3',5' MONOPHOSPHATE
    - CELL CYCLE KINETICS, HAMSTER OVARY, 6806*
    - PHOSPHODIESTERASES, 6806*

  - RADIATION-PROTECTIVE AGENTS, 6806*
- AGE FACTORS
  - DOSE-RESPONSE STUDY, RAT, 6813*
- AGING
  - IMMUNE RESPONSE, 6938*
- BENZENESULFONIC ACID
  - ISOBUTYRIC ACID, ALPHA-AMINO-, 6812*
- BENZOIC ACID, 3,3'-DITHIOBIS-6-NITRO-
  - ISOBUTYRIC ACID, ALPHA-AMINO-, 6812*
- BONE MARROW
  - ABSORBED DOSE RATE, 6801
- CELL CYCLE KINETICS, HAMSTER OVARY
  - RADIATION-SENSITIZING AGENTS, 6820*
- CERVIX NEOPLASMS
  - DIAGNOSIS AND PROGNOSIS, 6974
- CHROMOSOME ABERRATIONS
  - RADIATION GENETICS, REVIEW, 6643*
  - STATISTICAL ANALYSIS, 6824*
- CHROMOSOME ABNORMALITIES
  - CHROMOSOME ABERRATIONS, 6824*
- CYCLOHEXIMIDE
  - CELL CYCLE KINETICS, HAMSTER OVARY, 6821*
- CYSTEINE
  - DNA REPLICATION, 6776*
- DNA
  - SINGLE-STRAND BREAKS, 6811*
  - UREA, THIO-, 6811*
- DNA REPAIR
  - CELL TRANSFORMATION, NEOPLASTIC, REVIEW, 6634
  - RECOMBINATION, 7176
- ENVIRONMENTAL HAZARD
  - ABSORBED DOSE RATE, 6801
- GERM CELLS
  - RADIATION GENETICS, REVIEW, 6643*
- GLIOMA
  - EPIDEMIOLOGY, CHILD, 6825*
- GONADS
  - ABSORBED DOSE RATE, 6801
- HETEROXANTHINE, ISOBUTYL-
  - CELL CYCLE KINETICS, HAMSTER OVARY, 6806*
  - RADIATION-PROTECTIVE AGENTS, 6806*
- IODINE RADIOISOTOPES
  - CELL MEMBRANE, 6819*
- ISOANTIGENS
  - GRAFT VS HOST REACTION, 6942*
- LEUKEMIA
  - CELLS, CULTURED, 6811*
  - DOSE-RESPONSE STUDY, MOUSE, 6810*
  - EPIDEMIOLOGY, CHILD, 6825*
  - RADIATION CHIMERA, 6822*
- LEUKEMIA, LYMPHOCYTIC
  - ANTIGENS, 6929
  - DOSE-RESPONSE STUDY, 6842
  - HISTOCOMPATIBILITY ANTIGENS, 6929
- LEUKEMIA, MYELOCYTIC
  - RADIATION GENETICS, REVIEW, 6643*
- LIVER NEOPLASMS
  - DOSE-RESPONSE STUDY, MOUSE, 6810*
- LUNG NEOPLASMS
  - DOSE-RESPONSE STUDY, MOUSE, 6810*
- B-LYMPHOCYTES
  - LIPOPOLYSACCHARIDES, 6799
  - LYMPHOCYTE TRANSFORMATION, 6799
  - PLANT AGGLUTININS, 6799
  - SPLEEN, MOUSE, 6799
- T-LYMPHOCYTES
  - ALLOGENEIC SUPPRESSIVE FACTOR, 6943*
  - ISOBUTYRIC ACID, ALPHA-AMINO-, 6812*
  - LIPOPOLYSACCHARIDES, 6799
  - PLANT AGGLUTININS, 6799
  - SPLEEN, MOUSE, 6799
- LYMPHOMA
  - EPIDEMIOLOGY, CHILD, 6825*
  - VIRUS, RADIATION LEUKEMIA, 6839
- LYMPHOSARCOMA
  - DOSE-RESPONSE STUDY, 6842
- MAMMARY NEOPLASMS, EXPERIMENTAL
  - EPIDEMIOLOGY, RAT, 6809*
  - GENETICS, 6809*
  - NEOPLASM METASTASIS, 6804*, 6805*
  - NEOPLASM TRANSPLANTATION, 6804*, 6805*
  - STEROIDS, 6804*
- MELANOMA
  - NEOPLASM METASTASIS, 6923
- MUTAGENIC ACTIVITY
  - CELLS, CULTURED, HAMSTER, 6778*
- MUTATION
  - GRAFT REJECTION, 6823*
  - MUTAGENIC ACTIVITY, 6823*
- NEPHROSCLEROSIS
  - RADIATION CHIMERA, 6822*
- ONCOGENIC VIRUSES
  - CELL TRANSFORMATION, NEOPLASTIC, REVIEW, 6634
- PLANT AGGLUTININS
  - LYMPHOCYTE DEPLETION, 6799
- QUINOLINE, 4-NITRO-, 1-OXIDE
  - DNA REPLICATION, 6776*
- RADIATION CHIMERA
  - DOSE-RESPONSE STUDY, 6822*
- RADIATION-SENSITIZING AGENTS
  - CELL CYCLE KINETICS, HAMSTER OVARY, 6821*
- RADIOISOTOPES
  - DOSE-RESPONSE STUDY, 6800
- SARCOMA, RETICULUM CELL
  - DOSE-RESPONSE STUDY, MOUSE, 6810*
  - RADIATION CHIMERA, 6822*
- SKIN NEOPLASMS
  - AGE FACTORS, 6813*
  - DOSE-RESPONSE STUDY, RAT, 6813*
  - HISTOLOGICAL STUDY, RAT, 6814*
  - ULTRAVIOLET RAYS, 6814*
- THYMOMA
  - DOSE-RESPONSE STUDY, 6842
  - RADIATION CHIMERA, 6822*
- THYROID NEOPLASMS
  - RISK FACTORS, REVIEW, 6639
- TISSUE CULTURE
  - CELL CYCLE KINETICS, HAMSTER OVARY, 6808*
- VIRUS-LIKE PARTICLES
  - SARCOMA, OSTEOGENIC, 6896*
- VIRUS, MURINE LEUKEMIA
  - VIRUS REPLICATION, 6842
- VIRUS, RADIATION LEUKEMIA
  - ANTIGENS, VIRAL, 6840
  - CELL TRANSFORMATION, NEOPLASTIC, 6839

- VIRUS REPLICATION, 6840

RADIOACTIVE FALLOUT
- LEUKEMIA
  - PRECANCEROUS CONDITIONS, 6802

RADIOISOTOPES
- ALPHA PARTICLES
  - DOSE-RESPONSE STUDY, 6800
- FISHES
  - CARCINOGENIC POTENTIAL, REVIEW, 6644*
- PROMETHIUM
  - CHROMOSOME ABERRATIONS, 6816*
  - METABOLISM, HAMSTER, 6816*
- RADIATION EFFECTS
  - TARGET ORGAN, REVIEW, 6636
- RADIATION, IONIZING
  - DOSE-RESPONSE STUDY, 6800
- TECHNETIUM
  - RADIATION EFFECTS, SPERM, MOUSE, 6817*
  - RADIATION INJURIES, EXPERIMENTAL, 6817*
- WATER POLLUTANTS
  - CARCINOGENIC POTENTIAL, REVIEW, 6644*

RADIUM
- VIRUS-LIKE PARTICLES
  - SARCOMA, OSTEOGENIC, 6896*

RECEPTORS, HORMONE
- MAMMARY NEOPLASMS, EXPERIMENTAL
  - ESTRADIOL, 6783*

RECTAL NEOPLASMS
- GENETICS
  - EPIDEMIOLOGY, REVIEW, 6612
- PRECANCEROUS CONDITIONS
  - EPIDEMIOLOGY, REVIEW, 6612
  - VILLOUS TUMORS, 6654*

RESPIRATORY TRACT NEOPLASMS
- AIR POLLUTANTS
  - EPIDEMIOLOGY, 7147*
- ASBESTOS
  - OCCUPATIONAL HAZARD, 7119
  - PARTICLE SIZE, 7148*
- CADMIUM
  - EPIDEMIOLOGY, 7120
- CARCINOMA, BRONCHOGENIC
  - URANIUM, 7116
- CARCINOMA, OAT CELL
  - URANIUM, 7116
- CHALONES
  - COLCHICINE, N-DEACETYL-N-METHYL-, 7157
  - MITOSIS, 7157
- 7H-DIBENZO(C,G)CARBAZOLE
  - DOSE-RESPONSE STUDY, HAMSTER, 6754*
  - PRECANCEROUS CONDITIONS, 6754*
- EPIDEMIOLOGY
  - SMOKING, 7116
- LEAD
  - AIR POLLUTION, 7147*
  - EPIDEMIOLOGY, 7118
  - OCCUPATIONAL HAZARD, 7118
- OCCUPATIONAL HAZARD
  - EPIDEMIOLOGY, 7116, 7119, 7120
- PROPYLAMINE, N-NITROSO-BIS(2-ACETOXY)-
  - HISTOLOGICAL STUDY, HAMSTER, 6680
- URANIUM
  - OCCUPATIONAL HAZARD, 7116
  - SMOKING, 7116

RETICULOCYTES
- VIRUS, RAUSCHER MURINE LEUKEMIA
  - RNA REPLICATION, 6888*

RETICULOENDOTHELIOSIS
- LANGERHANS CELLS
  - GRANULES, 7071*

RETICULOSARCOMA
- SEE SARCOMA, RETICULUM CELL

RETINOBLASTOMA
- GENETICS
  - CHROMOSOME ABERRATIONS, REVIEW, 6983
  - CHROMOSOMES, 7055*
  - HISTOLOGICAL STUDY, 6982
  - MITOCHONDRIA, 6982
- MUTATION
  - CHROMOSOME ABERRATIONS, REVIEW, 6983

REVERSE TRANSCRIPTASE
- ESTROGENS
  - UTERUS, MOUSE, 6898*
- HEPATOMA
  - DIETHYLAMINE, N-NITROSO-, 6765*
- LEUKEMIA
  - CASE REPORT, 7061*
  - DIAGNOSIS, 7061*
  - PRECANCEROUS CONDITIONS, 7061*
- ONCOGENIC VIRUSES
  - RNA, 6645*
- PLASMACYTOMA
  - C-TYPE PARTICLES, 6874
  - ISOLATION AND CHARACTERIZATION, 6874
- VIRUS, AVIAN MYELOBLASTOSIS
  - DNA REPLICATION, 6829
- VIRUS, MURINE MAMMARY TUMOR
  - RNA, 6645*
- VIRUS, RAUSCHER MURINE LEUKEMIA
  - ISOLATION, PROCEDURE, 6887*
- VIRUS, VISNA
  - REVIEW, 6618

RHABDOMYOSARCOMA
- ANTIGENS, NEOPLASM
  - CELL MEMBRANE, 7141*
- BONE NEOPLASMS
  - WOUNDS AND INJURIES, 6803
- CALCIUM
  - DNA REPLICATION, 7161
- HAMARTOMA
  - PRECANCEROUS CONDITIONS, 7063*
- HEART NEOPLASMS
  - MOUSE, 6775*
- HISTOCOMPATIBILITY ANTIGENS
  - CELL MEMBRANE, 7141*
- NEVUS, PIGMENTED
  - PRECANCEROUS CONDITIONS, 7063*

- NICKEL SULFIDE
  - DNA REPLICATION, 7161

- RIBONUCLEASE
  - CARCINOMA, EHRLICH TUMOR
    - RNA, NEOPLASM, 7173
  - VIRUS, MOLONEY MURINE LEUKEMIA
    - RNA, VIRAL, 6849
  - VIRUS, ROUS SARCOMA
    - BINDING, 6877*

- RIBOSOMAL PROTEINS
  - ACTINOMYCIN D
    - FIBROBLASTS, 7166
  - CARBAMIC ACID, ETHYL ESTER
    - CELL AGGREGATION, 6717
    - LIVER, RAT, 6717
  - FIBROBLASTS
    - LEUCINE INCORPORATION, 7166
    - PEPTIDE ELONGATION FACTORS, 7166
  - GROWTH SUBSTANCES
    - FIBROBLASTS, 7166
  - HEPATOMA
    - ISOLATION AND CHARACTERIZATION, 7168

- RIBOSOMES
  - BUTYRIC ACID, 2-AMINO-4-(ETHYLTHIO)-
    - CELL MEMBRANE, 6741*
  - HEPATOMA
    - ULTRASTRUCTURAL STUDY, 7168

- RNA
  - CELL DIFFERENTIATION
    - REVIEW, 6640
  - DNA-RNA HYBRIDIZATION
    - DUAL-LABELING SYSTEM, 7174
  - FIBROSARCOMA
    - IMMUNITY, CELLULAR, 6932
  - IMMUNITY, CELLULAR
    - ISOLATION AND CHARACTERIZATION, 6932
  - LIVER
    - DNA-RNA HYBRIDIZATION, 7174
  - ONCOGENIC VIRUSES
    - REVERSE TRANSCRIPTASE, 6645*
  - VIRUS, AVIAN MYELOBLASTOSIS
    - ESTROGENS, 6720
  - VIRUS, MURINE MAMMARY TUMOR
    - REVERSE TRANSCRIPTASE, 6645*
  - VIRUS, RNA TUMOR
    - VIRUS-LIKE PARTICLES, 6900*

- RNA, MESSENGER
  - CARCINOMA, EHRLICH TUMOR
    - RNA, NEOPLASM, 7173
  - HEPATOMA
    - FRUCTOSEDIPHOSPHATE ALDOLASE, 7181
    - ISOENZYMES, 7181
    - POLYRIBOSOMES, 7181
  - PLASMACYTOMA
    - CELL CYCLE KINETICS, 7171
    - IMMUNOGLOBULINS, LIGHT CHAIN, 7171
    - ISOLATION AND CHARACTERIZATION, 7171
  - VIRUS, ADENO 2
    - CELL TRANSFORMATION, NEOPLASTIC, 6865
    - RNA-DNA HYBRIDIZATION, 6865
  - VIRUS, FROG 3
    - ISOLATION AND CHARACTERIZATION, 6834
    - POLY A, 6834
  - VIRUS, POLYOMA
    - DNA-RNA HYBRIDIZATION, 6861
    - ENDONUCLEASES, 6861
    - ISOLATION AND CHARACTERIZATION, 6861
  - VIRUS, SV40
    - CELL TRANSFORMATION, NEOPLASTIC, 6851
  - VIRUS, VACCINIA
    - POLY A, 6834

- RNA, NEOPLASM
  - CARCINOMA, EHRLICH TUMOR
    - ETHIDIUM BROMIDE, 7173
    - RIBONUCLEASE, 7173
    - RNA, MESSENGER, 7173

- RNA POLYMERASE
  - BENZENAMINE, N,N-DIMETHYL-4-((3-METHYLPHENYL)AZO)-
    - CELL TRANSFORMATION, NEOPLASTIC, 6687
    - CHROMATIN, 6677
    - LIVER, RAT, 6687
  - DIETHYLAMINE, N-NITROSO-
    - CARCINOGENIC ACTIVITY, RAT, 6766*
    - CELL NUCLEUS, 6766*
  - FIBROBLASTS
    - ALPHA-AMANITIN RESISTANCE, 6667
    - METHANESULFONIC ACID, ETHYL ESTER, 6667
  - HEPATOMA
    - ANILINE, N,N-DIMETHYL-P-PHENYLAZO-, 6675
    - DIETHYLAMINE, N-NITROSO-, 6765*
    - ISOLATION AND CHARACTERIZATION, 6675
  - METHANESULFONIC ACID, ETHYL ESTER
    - ALPHA-AMANITIN RESISTANCE, 6667
  - VIRUS, HERPES SIMPLEX 1
    - RNA REPLICATION, 6873
  - VIRUS, POLYOMA
    - DNA REPLICATION, 6862

- RNA REPLICATION
  - BENZENAMINE, N,N-DIMETHYL-4-((3-METHYLPHENYL)AZO)-
    - LIVER, RAT, 6677
  - CARBAMIC ACID, ETHYL ESTER
    - LIVER, RAT, 6717
  - VIRUS, HERPES SIMPLEX 1
    - ALPHA-AMANITINE, 6873
    - ARGININE, 6873
    - RNA POLYMERASE, 6873
  - VIRUS, POLYOMA
    - URIDINE, 2'-DEOXY-5-FLUORO-, 6863
  - VIRUS, RAUSCHER MURINE LEUKEMIA
    - OVUM, 6888*
    - PEPTIDES, 6888*
    - RETICULOCYTES, 6888*

- RNA, RIBOSOMAL
  - HEPATOMA
    - ENZYMATIC ACTIVITY, 7182

- RNA, TRANSFER
  - AMINO ACIDS
    - CELLS, CULTURED, 7170
  - BENZENAMINE, N,N-DIMETHYL-4-((3-METHYLPHENYL)AZO)-
    - ALANINE, PHENYL-, 6732*
    - LIVER, RAT, 6732*
  - HELA CELLS
    - TYROSINE ISOACCEPTORS, 7172
  - PLACENTA
    - TYROSINE ISOACCEPTORS, 7172

- RNA, TRANSFER, METHYLTRANSFERASES
  - AMINO ACIDS
    - CELLS, CULTURED, 7170

- RNA, VIRAL
  - PLASMACYTOMA
    - ISOLATION AND CHARACTERIZATION, 6874
  - VIRUS, ADENO 2
    - CELL TRANSFORMATION, NEOPLASTIC, 6865
    - RNA-DNA HYBRIDIZATION, 6865
  - VIRUS, HAMSTER LEUKEMIA
    - POLYNUCLEOTIDES, 6891*
  - VIRUS, HERPES SIMPLEX 1
    - DNA-RNA HYBRIDIZATION, 6873
  - VIRUS, MOLONEY MURINE LEUKEMIA
    - ETHIDIUM BROMIDE, 6849
    - MICROSOMES, LIVER, 6849
    - RIBONUCLEASE, 6849
  - VIRUS, MURINE SARCOMA
    - POLYNUCLEOTIDES, 6891*
  - VIRUS, POLYOMA
    - ISOLATION AND CHARACTERIZATION, 6863
    - POLY A, 6863
  - VIRUS, RAUSCHER MURINE LEUKEMIA
    - POLYNUCLEOTIDES, 6891*
  - VIRUS, ROUS SARCOMA
    - OLIGONUCLEOTIDES, 6876*
    - REPLICATION-DEFECTIVE DELETION MUTANTS, 6876*
  - VIRUS, SV40
    - CELL TRANSFORMATION, NEOPLASTIC, 6851, 6852

- RUBELLA
  - LYMPHOMA
    - LYMPHOCYTE DEPLETION, 7073*

- SALIVA
  - INFECTIOUS MONONUCLEOSIS
    - VIRUS, EPSTEIN-BARR, 6908*
  - VIRUS, EPSTEIN-BARR
    - HORIZONTAL TRANSMISSION, 6908*

- SALIVARY GLAND NEOPLASMS
  - ACETAMIDE, N,N'-9H-FLUORENE-2,7-DIYLBIS-
    - DOSE-RESPONSE STUDY, MOUSE, 6676

- SARCOIDOSIS
  - ANTIGENS
    - HYPERSENSITIVITY, DELAYED, REVIEW, 6652*
  - PHAGOCYTE BACTERICIDAL DYSFUNCTION
    - HYPERSENSITIVITY, DELAYED, REVIEW, 6652*

- SARCOMA
  - ASCITIC FLUID
    - MONOAMINE OXIDASE, 7189
  - CHOLANTHRENE, 3-METHYL-
    - CYTOCHROME P-450, 6692
    - IMMUNITY, CELLULAR, 6940*
    - OXIDOREDUCTASES, 6692
  - FIBROSARCOMA
    - MIGRATION INHIBITORY FACTOR, 6918
  - GUANIDINE, 1-METHYL-3-NITRO-1-NITROSO-
    - ASPARAGINE REQUIREMENT, MUTATION, 6715
  - HEPATOMA
    - MIGRATION INHIBITORY FACTOR, 6918
  - IMMUNITY, CELLULAR
    - CELL ADHESION, 6940*
  - IMMUNOSUPPRESSION
    - NEOPLASM METASTASIS, REVIEW, 6620
  - KIDNEY NEOPLASMS
    - IMMUNITY, CELLULAR, 6933*
    - TRANSPLANTATION, HOMOLOGOUS, 6933*
  - LIVER
    - MONOAMINE OXIDASE, 7189
  - LUNG NEOPLASMS
    - ACTINOMYCIN D, 6791*
    - BLEOMYCIN, 6791*
    - CYCLOPHOSPHAMIDE, 6791*
    - CYTOSINE, 1-BETA-D-ARABINOFURANOSYL-, 6791*
    - METHOTREXATE, 6791*
    - NEOPLASM METASTASIS, 6967
    - URACIL, 5-FLUORO-, 6791*
    - VINCALEUKOBLASTINE, 6791*
  - T-LYMPHOCYTES
    - NEOPLASM METASTASIS, REVIEW, 6620
  - MACROPHAGES
    - MIGRATION INHIBITORY FACTOR, 6918
  - METHANESULFONIC ACID, ETHYL ESTER
    - ASPARAGINE REQUIREMENT, MUTATION, 6715
  - NEOPLASM METASTASIS
    - ANIMAL MODEL, RAT, 6967
  - NEOPLASM TRANSPLANTATION
    - IMMUNITY, CELLULAR, 6940*
  - ODONTOGENIC TUMOR
    - CASE REPORT, 7040*
  - QUINACRINE HYDROCHLORIDE
    - ASPARAGINE REQUIREMENT, MUTATION, 6715
  - SKIN NEOPLASMS
    - PIKE, BALTIC SEA, 7151*
  - TERATOID TUMOR
    - MIGRATION INHIBITORY FACTOR, 6918
  - TRIAZENE, 3,3-DIETHYL-1-(M-PYRIDYL)-
    - CARCINOGENIC ACTIVITY, 6705
  - TRIAZENE, 3,3-DIETHYL-1-PHENYL-
    - CARCINOGENIC ACTIVITY, 6705
  - URIDINE, 5-BROMO-2'-DEOXY-
    - ASPARAGINE REQUIREMENT, MUTATION, 6715
  - UTERINE NEOPLASMS
    - LEIOMYOSARCOMA, 7024*
    - ULTRASTRUCTURAL STUDY, 7023*, 7024*
  - VIRUS, SV40
    - ANTIGENS, NEOPLASM, 6853

- SARCOMA, KAPOSI'S
  - ANTIBODIES, VIRAL
    - VIRUS, EPSTEIN-BARR, 6965
  - SKIN NEOPLASMS
    - CASE REPORT, 6966
    - ULTRASTRUCTURAL STUDY, 6966
  - TRANSPLANTATION, HOMOLOGOUS
    - CASE REPORT, 6965
    - IMMUNOSUPPRESSION, 6965
    - PREDNISONE, 6965
    - PURINE, 6-((1-METHYL-4-NITROIMIDAZOL-5-YL)THIO)-, 6965
    - VIRUS, EPSTEIN-BARR, 6965

- SARCOMA, OSTEOGENIC
  - AMERICIUM
    - DOSE-RESPONSE STUDY, MOUSE, 6798
  - ANTICOAGULANTS
    - NEOPLASM METASTASIS, REVIEW, 6649*
  - ANTIGENS, NEOPLASM
    - CELL MEMBRANE, 7141*
  - BONE NEOPLASMS
    - CASE REPORT, 7039*
    - FIBROUS DYSPLASIA, POLYOSTOTIC, 7039*
    - NEOPLASM METASTASIS, 7039*
  - CYCLOPHOSPHAMIDE
    - NEOPLASM METASTASIS, REVIEW, 6649*
  - HISTOCOMPATIBILITY ANTIGENS
    - CELL MEMBRANE, 7141*
  - LIVER NEOPLASMS
    - ISOTHIOCYANIC ACID, 1-NAPHTHYL ESTER, 6723*
  - LUNG NEOPLASMS
    - NEOPLASM METASTASIS, REVIEW, 6649*
  - VIRUS-LIKE PARTICLES
    - RADIATION, IONIZING, 6896*
    - RADIUM, 6896*

- SARCOMA, RETICULUM CELL
  - CELL LINE
    - MURAMIDASE, 7187
  - CHROMOSOMES, HUMAN, 13-15
    - CHROMOSOME ABNORMALITIES, 7060*
  - B-LYMPHOCYTES
    - CLASSIFICATION, REVIEW, 6638
  - LYMPHOSARCOMA
    - ANTIGENIC DETERMINANTS, 6927
  - NEUTRONS
    - DOSE-RESPONSE STUDY, MOUSE, 6810*
  - RADIATION, IONIZING
    - DOSE-RESPONSE STUDY, MOUSE, 6810*
    - RADIATION CHIMERA, 6822*

- SARCOSINE, N-NITROSO-
  - DIMETHYLAMINE, N-NITROSO-
    - HEPATOTOXICITY, 6764*

- SCLERODERMA, SYSTEMIC
  - GASTROINTESTINAL NEOPLASMS
    - EPIDEMIOLOGY, REVIEW, 6625
  - GYNECOLOGIC NEOPLASMS
    - EPIDEMIOLOGY, REVIEW, 6625
  - IMMUNOLOGIC DISEASES
    - EPIDEMIOLOGY, REVIEW, 6625
  - LUNG NEOPLASMS
    - EPIDEMIOLOGY, REVIEW, 6625
  - LYMPHOMA
    - EPIDEMIOLOGY, REVIEW, 6625
  - NEOPLASMS, VASCULAR TISSUE
    - EPIDEMIOLOGY, REVIEW, 6625
  - SKIN NEOPLASMS
    - EPIDEMIOLOGY, REVIEW, 6625

- SEMINOMA
  - SEE DISGERMINOMA

- SERINE DEHYDRATASE
  - ACETAMIDE, N-FLUOREN-2-YL-
    - CELL TRANSFORMATION, NEOPLASTIC, REVIEW, 6631
  - HEPATOMA
    - ENZYMATIC ACTIVITY, REVIEW, 6631

- SERUM ALBUMIN, BOVINE
  - MAMMARY NEOPLASMS, EXPERIMENTAL
    - ANTIGEN-ANTIBODY COMPLEX, 6954*

- SERUM GLOBULINS
  - NEOPLASM METASTASIS
    - REVIEW, 6658*

- SEX CHROMOSOMES
  - HETEROCHROMATIN
    - C-BANDING, PEROMYSCUS, 7056*
  - THYROID NEOPLASMS
    - ADENOMA, 6979

- SIALIC ACIDS
  - ISOANTIGENS
    - S-49 CELLS, 6945*

- SIDEROSIS
  - LIVER NEOPLASMS
    - ACETAMIDE, N-FLUOREN-2-YL-, 6728*
    - CELL DIVISION, 6728*

- SILICA
  - CARCINOMA, BRONCHOGENIC
    - EPIDEMIOLOGY, MONTANA, 7144*

- SILICIC ACID, CALCIUM SALT
  - STOMACH NEOPLASMS
    - ULTRASTRUCTURAL STUDY, 7019

- SILVER NITRATE
  - VIRUS, HERPES SIMPLEX 1
    - AGGLUTINATION, 6910*
    - CYTOPATHOGENIC EFFECT, VIRAL, 6910*
    - VIRUS REPLICATION, 6910*
  - VIRUS, HERPES SIMPLEX 2
    - AGGLUTINATION, 6910*
    - CYTOPATHOGENIC EFFECT, VIRAL, 6910*
    - VIRUS REPLICATION, 6910*

- SKIN
  - BENZ(A)ANTHRACENE
    - RETENTION, MOUSE, HAMSTER, 6752*
  - BENZO(A)PYRENE
    - RETENTION, MOUSE, HAMSTER, 6752*
  - CHRYSENE
    - RETENTION, MOUSE, HAMSTER, 6752*
  - DIBENZ(A,H)ANTHRACENE
    - RETENTION, MOUSE, HAMSTER, 6752*

SKIN NEOPLASMS
  CARCINOMA, MUCINOUS
    NEOPLASM TRANSPLANTATION, 6973
  DUPUYTREN'S CONTRACTURE
    ULTRASTRUCTURAL STUDY, 7090*
  FISHES
    KARYOTYPING, 7151*
    NEOPLASM TRANSPLANTATION, 7151*
    VERTICAL TRANSMISSION, 7151*
  B-LYMPHOCYTES
    NEOPLASM METASTASIS, 6930
  T-LYMPHOCYTES
    NEOPLASM METASTASIS, 6930
  MELANOMA
    EPIDEMIOLOGY, 7133*
    VIRUS, PAPOVA, 6902*
  NEOPLASM TRANSPLANTATION
    UTEROSTOMY, 6973
  RADIATION, IONIZING
    AGE FACTORS, 6813*
    DOSE-RESPONSE STUDY, RAT, 6813*
    HISTOLOGICAL STUDY, RAT, 6814*
    ULTRAVIOLET RAYS, 6814*
  SARCOMA
    PIKE, BALTIC SEA, 7151*
  SARCOMA, KAPOSI'S
    CASE REPORT, 6966
    ULTRASTRUCTURAL STUDY, 6966
  SCLERODERMA, SYSTEMIC
    EPIDEMIOLOGY, REVIEW, 6625
  ULTRAVIOLET RAYS
    HISTOLOGICAL STUDY, RAT, 6814*
    IMMUNE RESPONSE, 6936*
    TRANSPLANTATION, AUTOLOGOUS, 6936*
    TRANSPLANTATION, HOMOLOGOUS, 6936*

SMOKING
  ARYL HYDROCARBON HYDROXYLASES
    LUNG, RODENT, 6693
  BENZ(A)ANTHRACENE, 7,12-DIMETHYL-
    COCARCINOGENIC ACTIVITY, 6681
  BENZO(A)PYRENE
    CIGARETTE CONDENSATE, 6701
    QUANTITATION METHOD, 6701
  FIBRINOLYSIS
    CELL TRANSFORMATION, NEOPLASTIC, 6758*
  GLYCOPROTEINS
    CELL TRANSFORMATION, NEOPLASTIC, 6758*
  LARYNGEAL NEOPLASMS
    MYOBLASTOMA, 6990
  LUNG NEOPLASMS
    ADENOCARCINOMA, 7112
    CARCINOMA, EPIDERMOID, 7112
    CARCINOMA, OAT CELL, 7112
    EPIDEMIOLOGY, 7112
    EPIDEMIOLOGY, REVIEW, 6656*
  POLYCYCLIC HYDROCARBONS
    ISOLATION AND CHARACTERIZATION, 6681
  RESPIRATORY TRACT NEOPLASMS
    EPIDEMIOLOGY, 7116
    URANIUM, 7116

SOMATOTROPIN
  DNA REPLICATION
    FIBROBLASTS, REVIEW, 6646*
  PITUITARY NEOPLASMS
    ANILINE, 2,4,6-TRIMETHYL-, 6733*

SPERMIDINE
  METHYLGLYOXAL BIS(GUANYLHYDRAZONE) DIACETATE
    DNA REPLICATION, 7177

SPERMINE
  METHYLGLYOXAL BIS(GUANYLHYDRAZONE) DIACETATE
    DNA REPLICATION, 7177

SPINA BIFIDA
  ETHYLENE, CHLORO- POLYMER
    EPIDEMIOLOGY, 6735*

SPLEEN
  ISOANTIGENS
    ALLOGENEIC SUPPRESSIVE FACTOR, 6942*
  T-LYMPHOCYTES
    ALLOGENEIC SUPPRESSIVE FACTOR, 6943*
  VIRUS, FRIEND MURINE LEUKEMIA
    ANTIGENS, NEOPLASM, 6885*
    CELL TRANSFORMATION, NEOPLASTIC, 6885*
    SURFACE PROPERTIES, 6885*
  VIRUS, MOLONEY MURINE SARCOMA
    IMMUNITY, CELLULAR, 6850
  VIRUS, RADIATION LEUKEMIA
    VIRUS REPLICATION, 6840
  VIRUS, RAUSCHER MURINE LEUKEMIA
    ERYTHROPOIESIS, 6844

SPLENIC NEOPLASMS
  CARCINOMA, EPIDERMOID
    DIETHYLAMINE, N-NITROSO-, 7094*
  DIETHYLAMINE, N-NITROSO-
    TRANSPLANTATION, HOMOLOGOUS, 7094*
  POLYPS
    DIETHYLAMINE, N-NITROSO-, 7094*

STEROIDS
  INTESTINAL NEOPLASMS
    BACTEROIDES DISTASONIS, 6665
    BACTEROIDES FRAGILIS, 6665
    BACTEROIDES THETAIOTAOMICRON, 6665
    BACTEROIDES VULGATUS, 6665
  MAMMARY NEOPLASMS, EXPERIMENTAL
    RADIATION, IONIZING, 6804*

4,4'-STILBENEDIOL, ALPHA,ALPHA'-DIETHYL-
  CHROMOSOME ABERRATIONS
    CELL TRANSFORMATION, NEOPLASTIC, 6650*
  SERUM LEVELS
    UTERINE RECEPTORS, 6721
  UTERINE RECEPTORS
    BINDING, 6716
  VIRAL PROTEINS
    UTERUS, MOUSE, 6898*

4,4'-STILBENEDIOL, ALPHA,ALPHA'-DIMETHYL-
  UTERINE RECEPTORS
    BINDING, 6716

4,4'-STILBENEDIOL, 6,7'-DIMETHYL-7-ETHYL-
  UTERINE RECEPTORS
    BINDING, 6716

- STOMACH NEOPLASMS
  - ADENOCARCINOMA
    - DIETHYLAMINE, N-NITROSO-, 6762*
    - SUCRASE, 7017
  - AGE FACTORS
    - HISTOLOGICAL STUDY, 7017
  - ANEMIA, PERNICIOUS
    - CASE REPORT, 6957
    - IGA, 6957
    - IGM, 6957
  - ASBESTOS
    - ULTRASTRUCTURAL STUDY, 7019
  - BENZO(A)PYRENE
    - DISULFIDE, BIS (DIETHYLTHIOCARBAMOYL)-, 6756*
  - CARCINOMA
    - PRECANCEROUS CONDITIONS, 7107
    - SUCRASE, 7017
  - CELLULAR INCLUSIONS
    - ULTRASTRUCTURAL STUDY, 7019
  - CHOLANTHRENE, 3-METHYL-
    - ANIMAL MODEL, HAMSTER, 6762*
    - DIETHYLAMINE, N-NITROSO-, 6762*
  - DIETHYLAMINE, N-NITROSO-
    - ANIMAL MODEL, HAMSTER, 6762*
  - DIMETHYLAMINE, N-NITROSO-
    - ANIMAL MODEL, HAMSTER, 6762*
    - DIETHYLAMINE, N-NITROSO-, 6762*
  - EPIDEMIOLOGY
    - GERMANY, 7127*
  - KAOLIN
    - ULTRASTRUCTURAL STUDY, 7019
  - PNEUMCTHORAX, ARTIFICIAL
    - EPIDEMIOLOGY, 7114
  - POLYPS
    - UREA, METHYL NITROSO-, 6772*
  - SILICIC ACID, CALCIUM SALT
    - ULTRASTRUCTURAL STUDY, 7019
  - SUCRASE
    - PRECANCEROUS CONDITIONS, 7017
  - TALC
    - ULTRASTRUCTURAL STUDY, 7019
  - UREA, METHYL NITROSO-
    - CARCINOGENIC EFFECT, 6772*
    - CARCINOGENIC POTENTIAL, 6774*

- STREPTOZOTICIN
  - ISLET CELL TUMOR
    - INSULIN, 6726*

- SUCCINATES
  - HEPATOMA
    - LYASES, 7184
  - KIDNEY NEOPLASMS
    - LYASES, 7184

- SUCRASE
  - STOMACH NEOPLASMS
    - ADENOCARCINOMA, 7017
    - CARCINOMA, 7017
    - PRECANCEROUS CONDITIONS, 7017

- SULFANILAMIDE
  - CYTOCHROME P-450
    - MICROSOMES, LIVER, 6690
    - THIOPYROPHOSPHORIC ACID, TETRAETHYL ESTER, 6690

- SULFHYDRYL COMPOUNDS
  - KIDNEY NEOPLASMS
    - VIRUS, LEOPARD FROG CARCINOMA, 7196*

- SULFURIC ACID, DIMETHYL ESTER
  - DNA
    - DEOXYRIBONUCLEASE, 6718

- SULPIRIDE
  - LIVER CIRRHOSIS
    - PROLACTIN, 6642*

- SURFACE PROPERTIES
  - VIRUS, FRIEND MURINE LEUKEMIA
    - SPLEEN, 6885*

- SURGERY, OPERATIVE
  - PROSTATIC NEOPLASMS
    - NEOPLASM METASTASIS, 7030*

- TALC
  - STOMACH NEOPLASMS
    - ULTRASTRUCTURAL STUDY, 7019

- TANNIC ACID
  - LIVER NEOPLASMS
    - HISTOLOGICAL STUDY, FISH, 6744*
    - NECROSIS, 6744*

- TANNINS
  - ESOPHAGEAL NEOPLASMS
    - HISTIOCYTOMA, 6743*

- TARTARIC ACID
  - LEUKEMIA, HAIRY CELL
    - ACID PHOSPHATASE, 6997
    - CYTOCHEMICAL STUDY, 6997

- TEA
  - ESOPHAGEAL NEOPLASMS
    - HISTIOCYTOMA, 6743*

- TECHNETIUM
  - RADIOISOTOPES
    - RADIATION EFFECTS, SPERM, MOUSE, 6817*
    - RADIATION INJURIES, EXPERIMENTAL, 6817*

- TERATOID TUMOR
  - CLONE CELLS
    - CELL DIFFERENTIATION, 7152
    - CHROMOSOME ABNORMALITIES, 7152
  - OVARIAN NEOPLASMS
    - EPIDEMIOLOGY, 7002
  - SARCOMA
    - MIGRATION INHIBITORY FACTOR, 6918
  - VIRUS, POLYOMA
    - URIDINE, 5-BROMO-2'-DEOXY-, 6978
    - VIRUS REPLICATION, 6978
  - VIRUS, SV40
    - URIDINE, 5-BROMO-2'-DEOXY-, 6978
    - VIRUS REPLICATION, 6978

- TESTICULAR NEOPLASMS
  - CARCINOID TUMOR
    - CASE REPORT, 7029*
    - ULTRASTRUCTURAL STUDY, 7029*
  - CASE REPORT

    CARCINOID TUMOR, 7028*
  CRYPTORCHISM
    EPIDEMIOLOGY, 7009
  DISGERMINOMA
    CRYPTORCHISM, 7009
  LEYDIG CELL TUMOR
    CRYPTORCHISM, 7009
  THORIUM NITRATE
    CARCINOGENIC POTENTIAL, 6673

TESTOSTERONE
  BENZ(A)ANTHRACENE, 7,12-DIMETHYL-
    PROSTATE, RAT, 6782*
  CADMIUM CHLORIDE
    SERUM LEVELS, 6780*
  CELL DIFFERENTIATION
    PROSTATE, RAT, 6781*
  CELLS, CULTURED
    PROSTATE, RAT, 6781*
  CHOLANTHRENE, 3-METHYL-
    PROSTATE, RAT, 6782*
  UREA, ETHYL NITROSO-
    PROSTATE, RAT, 6782*

12-O-TETRADECANOYLPHORBOL-13-ACETATE
  BENZ(A)ANTHRACENE, 7,12-DIMETHYL-
    CARCINOMA, 6746*
    COCARCINOGENIC ACTIVITY, 6745*, 6746*
  CARCINOMA
    ULTRASTRUCTURAL STUDY, 6746*
  CARCINOMA, EPIDERMOID
    BENZ(A)ANTHRACENE, 7,12-DIMETHYL-, 6745*

THEOPHYLLINE
  POLYCYCLIC HYDROCARBONS
    MUTAGENIC ACTIVITY, REVIEW, 6641

THIOPYROPHOSPHORIC ACID, TETRAETHYL ESTER
  ANILINE, P-CHLORO-
    CYTOCHROME P-450, 6690
  ANILINE, 4,4'-SULFONYLDI-
    CYTOCHROME P-450, 6690
  INDOLINE, 2-METHYL-
    CYTOCHROME P-450, 6690
  SULFANILAMIDE
    CYTOCHROME P-450, 6690

THORAX
  AMERICIUM
    CASE REPORT, RETENTION, 6797

THORIUM DIOXIDE
  ANEMIA, APLASTIC
    CASE REPORT, 6826*
  LEUKEMIA, MONOBLASTIC
    CASE REPORT, 6826*
  LEUKEMIA, MYELOBLASTIC
    CASE REPORT, 6826*

THORIUM NITRATE
  TESTICULAR NEOPLASMS
    CARCINOGENIC POTENTIAL, 6673

THYMIDINE
  DNA
    DEOXYRIBONUCLEASE, 7179
    EMBRYO, RAT, 7179
  VIRUS, FRIEND MURINE LEUKEMIA
    ERYTHROPOIESIS, 6837

THYMIDINE KINASE
  VIRUS, HERPES SIMPLEX
    CELL FUSION, 6870
    CELL TRANSFORMATION, NEOPLASTIC, 6870
    MUTAGENS, 6870
    REACTIVATION, 6870

THYMOMA
  ANEMIA, APLASTIC
    CASE REPORT, 6958
  LYMPHOCYTES
    INTRACELLULAR FLUID, 7200*
    NUCLEAR MAGNETIC RESONANCE STUDY, 7200*
  RADIATION, IONIZING
    DOSE-RESPONSE STUDY, 6842
    RADIATION CHIMERA, 6822*
  TRANSPLANTATION, HOMOLOGOUS
    MOUSE, AKR, 6996
  VIRUS, RADIATION LEUKEMIA
    INTRACELLULAR FLUID, 7200*

THYMUS GLAND
  IMMUNITY, CELLULAR
    CELL TRANSFORMATION, NEOPLASTIC, 6933*
    TRANSPLANTATION, HOMOLOGOUS, 6933*
  LEUKEMIA, LYMPHOCYTIC
    ANTIGENS, 6929
    HISTOCOMPATIBILITY ANTIGENS, 6929
    IMMUNE RESPONSE, 6929
  TRANSPLANTATION, HOMOLOGOUS
    AGING, 6938*

THYMUS NEOPLASMS
  CARCINOID TUMOR
    CASE REPORT, 7047*
    NEOPLASM METASTASIS, 7047*
  LEUKEMIA, LYMPHOCYTIC
    AGE FACTORS, 6996
    VIRUS, MURINE LEUKEMIA, 6996
  NEOPLASTIC ENDOCRINE-LIKE SYNDROMES
    BIOGENIC AMINES, 7047*
  VIRUS, RADIATION LEUKEMIA
    CELL TRANSFORMATION, NEOPLASTIC, 6839

THYROGLOBULIN
  THYROID NEOPLASMS
    ADENOMA, 7043*
    CARCINOMA, 7043*

THYROID GLAND
  NECK NEOPLASMS
    TISSUE, ABERRANT, 7044*

THYROID NEOPLASMS
  ADENOCARCINOMA
    DIAGNOSIS AND TREATMENT, REVIEW, 6639
  ADENOMA
    SEX CHROMOSOMES, 6979
    THYROGLOBULIN, 7043*
    ULTRASTRUCTURAL STUDY, 7043*
  CARCINOMA

    - CASE REPORT, 6980
    - DIAGNOSIS AND TREATMENT, REVIEW, 6639
    - EXTREMITIES, 7041*
    - IMMUNITY, CELLULAR, 6920
    - NEOPLASM METASTASIS, 7041*
    - THYROGLOBULIN, 7043*
    - ULTRASTRUCTURAL STUDY, 6980, 7043*
  - GENETICS
    - DIAGNOSIS AND TREATMENT, REVIEW, 6639
  - IMMUNE SERUMS
    - LEUKOCYTE INHIBITION, 6920
  - IMMUNITY, CELLULAR
    - ANTIGENS, NEOPLASM, 6920
    - LEUKOCYTE INHIBITION, 6920
  - IODINE RADIOISOTOPES
    - RISK FACTORS, REVIEW, 6639
  - NEUROMA
    - DIAGNOSIS AND TREATMENT, REVIEW, 6639
  - PHEOCHROMOCYTOMA
    - DIAGNOSIS AND TREATMENT, REVIEW, 6639
  - RADIATION, IONIZING
    - RISK FACTORS, REVIEW, 6639
  - THYROTROPIN
    - DIAGNOSIS AND TREATMENT, REVIEW, 6639

- THYROIDITIS
  - IGG
    - ANTIGEN-ANTIBODY COMPLEX, 6921
  - IMMUNE SERUMS
    - IGG, 6921

- THYROTROPIN
  - LIVER CIRRHOSIS
    - PROLACTIN, 6642*
  - THYROID NEOPLASMS
    - DIAGNOSIS AND TREATMENT, REVIEW, 6639

- TILORONE
  - BARBITURIC ACID,5-(1-CYCLOHEXEN-1-YL)-1,5-DIMETHYL-, SODIUM SALT
    - METABOLISM, 6694
  - MICROSOMES, LIVER
    - CYTOCHROME P-450, 6694
    - HYDROXYLASES, 6694
    - OXIDOREDUCTASES, 6694

- TISSUE CULTURE
  - RADIATION, IONIZING
    - CELL CYCLE KINETICS, HAMSTER OVARY, 6808*
  - VIRUS, SV40
    - CELL TRANSFORMATION, NEOPLASTIC, 6852

- M-TOLUIDINE
  - ANTIPYRINE, 4-AMINO-
    - WATER POLLUTANTS, 6688

- O-TOLUIDINE
  - ANTIPYRINE, 4-AMINO-
    - WATER POLLUTANTS, 6688

- P-TOLUIDINE
  - ANTIPYRINE, 4-AMINO-
    - WATER POLLUTANTS, 6688

- TRACHEAL NEOPLASMS
  - DIETHYLAMINE, N-NITROSO-
    - TRANSPLANTATION, HOMOLOGOUS, 7094*
  - PAPILLOMA
    - DIETHYLAMINE, N-NITROSO-, 7094*
  - POLYPS
    - DIETHYLAMINE, N-NITROSO-, 7094*

- TRANSDUCTION, GENETIC
  - ULTRAVIOLET RAYS
    - DNA REPAIR, 6815*
    - ESCHERICHIA COLI, 6815*

- TRANSPLANTATION
  - VIRUS, PAPILLOMA
    - WARTS, 6904*

- TRANSPLANTATION ANTIGENS
  - SEE HISTOCOMPATIBILITY ANTIGENS

- TRANSPLANTATION, AUTOLOGOUS
  - SKIN NEOPLASMS
    - ULTRAVIOLET RAYS, 6936*

- TRANSPLANTATION, HETEROLOGOUS
  - CARCINOMA, EHRLICH TUMOR
    - G-BANDING, 7048*
    - MITOSIS, 7048*
  - MELANOMA
    - NEOPLASM METASTASIS, 7194*
    - URIDINE, 5-BROMO-2'-DEOXY-, 7194*

- TRANSPLANTATION, HOMOLOGOUS
  - BONE MARROW CELLS
    - AGING, 6938*
  - CELL TRANSFORMATION, NEOPLASTIC
    - IMMUNITY, CELLULAR, 6933*
    - VIRUS, POLYOMA, 6933*
  - KIDNEY NEOPLASMS
    - SARCOMA, 6933*
  - MAMMARY NEOPLASMS, EXPERIMENTAL
    - CARCINOMA, 6933*
  - MELANOMA
    - NEOPLASM METASTASIS, 6923
  - SARCOMA, KAPOSI'S
    - CASE REPORT, 6965
    - IMMUNOSUPPRESSION, 6965
    - PREDNISONE, 6965
    - PURINE, 6-((1-METHYL-4-NITROIMIDAZOL-5-YL)THIO)-, 6965
    - VIRUS, EPSTEIN-BARR, 6965
  - SKIN NEOPLASMS
    - ULTRAVIOLET RAYS, 6936*
  - SPLENIC NEOPLASMS
    - DIETHYLAMINE, N-NITROSO-, 7094*
  - THYMOMA
    - MOUSE, AKR, 6996
  - THYMUS GLAND
    - AGING, 6938*
    - IMMUNITY, CELLULAR, 6933*
  - TRACHEAL NEOPLASMS
    - DIETHYLAMINE, N-NITROSO-, 7094*

- TRANSPLANTATION IMMUNOLOGY
  - CELLS, CULTURED
    - IMMUNITY, CELLULAR, 6901*

- FIBROSARCOMA
  - CHOLANTHRENE, 3-METHYL-, 6924
- LYMPHOMA
  - HISTOCOMPATIBILITY ANTIGENS, 6944*
- VIRUS, POLYOMA
  - IMMUNITY, CELLULAR, 6901*

TRIAZENE, 3,3-DIETHYL-1-(M-PYRIDYL)-
- ADENOCARCINOMA
  - CARCINOGENIC ACTIVITY, 6705
- ASTROCYTOMA
  - CARCINOGENIC ACTIVITY, 6705
- EPENDYMOMA
  - CARCINOGENIC ACTIVITY, 6705
- LEUKEMIA
  - CARCINOGENIC ACTIVITY, 6705
- NEUROMA
  - CARCINOGENIC ACTIVITY, 6705
- SARCOMA
  - CARCINOGENIC ACTIVITY, 6705

TRIAZENE, 3,3-DIETHYL-1-PHENYL-
- ADENOCARCINOMA
  - CARCINOGENIC ACTIVITY, 6705
- ASTROCYTOMA
  - CARCINOGENIC ACTIVITY, 6705
- EPENDYMOMA
  - CARCINOGENIC ACTIVITY, 6705
- LEUKEMIA
  - CARCINOGENIC ACTIVITY, 6705
- NEUROMA
  - CARCINOGENIC ACTIVITY, 6705
- SARCOMA
  - CARCINOGENIC ACTIVITY, 6705

TRISOMY
- LEUKEMIA, MYELOBLASTIC
  - CASE REPORT, 7058*

TRYPSIN
- VIRUS, MURINE MAMMARY TUMOR
  - PEPTIDES, 6892*
  - ULTRASTRUCTURAL STUDY, 6892*
  - VIRUS REPLICATION, 6892*
- VIRUS, ROUS SARCOMA
  - BINDING, 6877*

TRYPTOPHAN
- GASTROINTESTINAL SYSTEM
  - CARCINOGENIC METABOLITE, 6722*
- INTESTINAL NEOPLASMS
  - EPIDEMIOLOGY, 6722*

TRYPTOPHAN OXYGENASE
- HEPATOMA
  - ENZYMATIC ACTIVITY, REVIEW, 6631

TUBERCULOSIS
- NEOPLASMS
  - ISONICOTINIC ACID HYDRAZIDE, 6706

TURBELLARIA
- NUCLEIC ACIDS
  - CELL TRANSFORMATION, NEOPLASTIC, 7097*
- WOUNDS AND INJURIES
  - CELL TRANSFORMATION, NEOPLASTIC, 7097*

TYROSINE
- P-CRESOL
  - METABOLISM, BACTERIA, 6724*

ULTRASTRUCTURAL STUDY
- LEUKEMIA, MYELOCYTIC
  - ERYTHROCYTES, 6961
- VIRUS, HERPES SIMPLEX 2
  - CELL TRANSFORMATION, NEOPLASTIC, 6912*

ULTRAVIOLET RAYS
- ACETOPHENONE
  - DNA REPLICATION, 6815*
- AMINO ACIDS
  - DNA REPAIR, 6795
- COLIPHAGES
  - DNA REPLICATION, 6815*
- DNA
  - PYRIMIDINE DIMERS, 6793
- DNA REPAIR
  - CELL TRANSFORMATION, NEOPLASTIC, REVIEW, 6634
- ESCHERICHIA COLI
  - DNA REPLICATION, 6815*
  - TRANSDUCTION, GENETIC, 6815*
- FIBROBLASTS
  - ENDONUCLEASES, 6793
  - PYRIMIDINE DIMERS, 6793
- HISTONES
  - DNA REPAIR, 6795
- MUTAGENIC ACTIVITY
  - CELLS, CULTURED, HAMSTER, 6778*
- NUCLEOPROTEINS
  - DNA REPAIR, 6795
- SKIN NEOPLASMS
  - HISTOLOGICAL STUDY, RAT, 6814*
  - IMMUNE RESPONSE, 6936*
  - RADIATION, IONIZING, 6814*
  - TRANSPLANTATION, AUTOLOGOUS, 6936*
  - TRANSPLANTATION, HOMOLOGOUS, 6936*
- TRANSDUCTION, GENETIC
  - DNA REPAIR, 6815*
- XERODERMA PIGMENTOSUM
  - COLONY FORMATION, 6796
  - DNA REPAIR, 6794, 6796
  - ENDONUCLEASES, 6793
  - PYRIMIDINE DIMERS, 6793

URACIL, 5-FLUORO-
- LUNG NEOPLASMS
  - SARCOMA, 6791*

URANIUM
- RESPIRATORY TRACT NEOPLASMS
  - CARCINOMA, BRONCHOGENIC, 7116
  - CARCINOMA, OAT CELL, 7116
  - OCCUPATIONAL HAZARD, 7116
  - SMOKING, 7116

UREA, 1,3-BIS(2-CHLOROETHYL)-1-NITROSO-
- BRAIN NEOPLASMS
  - UREA, ETHYL NITROSO-, 6768*

UREA, 1-(2-CHLOROETHYL)-3-CYCLOHEXYL-1-NITROSO-
- BRAIN NEOPLASMS

        UREA, ETHYL NITROSO-, 6768*

UREA, 1-(2-CHLOROETHYL)-3-(METHYLCYCLOHEXYL)-1-NITROSO-
    BRAIN NEOPLASMS
        UREA, ETHYL NITROSO-, 6768*

UREA, ETHYL NITROSO-
    BRAIN NEOPLASMS
        CARCINOGENIC ACTIVITY, RAT, 6771*
        CARCINOGENIC METABOLITE, 6771*
        CELL LINE, SKELETAL MUSCLE, 6767*
        UREA, 1,3-BIS(2-CHLOROETHYL)-1-NITROSO-, 6768*
        UREA, 1-(2-CHLOROETHYL)-3-CYCLOHEXYL-1-NITROSO-, 6768*
        UREA, 1-(2-CHLOROETHYL)-3-(METHYLCYCLOHEXYL)-1-NITROSO-, 6768*
    DNA
        CARCINOGENIC ACTIVITY, RAT, 6771*
        CARCINOGENIC METABOLITE, 6771*
        CARCINOGENIC POTENTIAL, 6713
    KIDNEY NEOPLASMS
        TRANSPLACENTAL CARCINOGENESIS, RABBIT, 6769*
    NEPHROBLASTOMA
        DOSE-RESPONSE STUDY, 6769*
        TRANSPLACENTAL CARCINOGENESIS, RABBIT, 6769*
    NEURILEMMOMA
        TRANSPLACENTAL CARCINOGENESIS, 6770*
        ULTRASTRUCTURAL STUDY, 6770*
    TESTOSTERONE
        PROSTATE, RAT, 6782*

UREA, METHYL NITROSO-
    DNA
        CARCINOGENIC POTENTIAL, 6713
        DEOXYRIBONUCLEASE, 6718
    FIBROBLASTS
        CELL CYCLE KINETICS, 6773*
        MUTAGENIC EFFECT, 6773*
    STOMACH NEOPLASMS
        CARCINOGENIC EFFECT, 6772*
        CARCINOGENIC POTENTIAL, 6774*
        POLYPS, 6772*

UREA, THIO-
    RADIATION, IONIZING
        DNA, 6811*

URIDINE, 5-BROMO-2'-DEOXY-
    DNA
        DEOXYRIBONUCLEASE, 7179
        EMBRYO, RAT, 7179
    MELANOMA
        CARCINOGENIC EFFECT, 6633
        CELLS, CULTURED, 6633
        TRANSPLANTATION, HETEROLOGOUS, 7194*
        VIRUS INDUCTION, 6633
    SARCOMA
        ASPARAGINE REQUIREMENT, MUTATION, 6715
    TERATOID TUMOR
        VIRUS, POLYOMA, 6978
        VIRUS, SV40, 6978

URIDINE, 2'-DEOXY-5-FLUORO-
    CELLS, CULTURED
        CELL TRANSFORMATION, NEOPLASTIC, 6758*
    FIBRINOLYSIS
        CELL TRANSFORMATION, NEOPLASTIC, 6758*
    GLYCOPROTEINS
        CELL TRANSFORMATION, NEOPLASTIC, 6758*
    VIRUS, POLYOMA
        RNA REPLICATION, 6863

URIDINE, 2'-DEOXY-5-IODO-
    LUNG NEOPLASMS
        NEOPLASM METASTASIS, 7159
    OVARIAN NEOPLASMS
        ANTI-NEOPLASTIC ACTIVITY, MOUSE, 6818*
        IODINE RADIOISOTOPES, 6818*
    VIRUS, EPSTEIN-BARR
        VIRAL PROTEINS, 6907*
    VIRUS, KIRSTEN MURINE SARCOMA
        VIRUS REPLICATION, 6897*

URINARY TRACT INFECTIONS
    UROGENITAL NEOPLASMS
        CARCINOMA, 7032*
        PAPILLOMA, 7032*

UROGENITAL NEOPLASMS
    CARCINOMA
        EPIDEMIOLOGY, 7032*
        URINARY TRACT INFECTIONS, 7032*
        UROLOGIC DISEASES, 7032*
        VIRUS, GENITAL WART, 6617
        VIRUS, HERPES SIMPLEX 2, 6617
    B-LYMPHOCYTES
        NEOPLASM METASTASIS, 6930
    T-LYMPHOCYTES
        NEOPLASM METASTASIS, 6930
    PAPILLOMA
        EPIDEMIOLOGY, 7032*
        URINARY TRACT INFECTIONS, 7032*
        UROLOGIC DISEASES, 7032*
    VIRUS, HERPES SIMPLEX 2
        CARCINOGENIC POTENTIAL, 6617

UROLOGIC DISEASES
    UROGENITAL NEOPLASMS
        CARCINOMA, 7032*
        PAPILLOMA, 7032*

UTERINE NEOPLASMS
    ADENOCARCINOMA
        ESTRADIOL, 6786*
        ESTRONE, 6786*
        NEOPLASMS, MULTIPLE PRIMARY, 6968
        ULTRASTRUCTURAL STUDY, 7001
    BODY WEIGHT
        ESTRADIOL, 6786*
        ESTRONE, 6786*
    BREAST NEOPLASMS
        ESTROGENS, 6790*
        PRECANCEROUS CONDITIONS, 6790*
    CARCINOMA
        AGE FACTORS, 7142*
        PRECANCEROUS CONDITIONS, 7142*
    ESTRADIOL

    - REVIEW, 6605
    - SERUM LEVELS, 6786*
  - ESTRIOL
    - REVIEW, 6605
  - ESTROGENS
    - EPIDEMIOLOGY, REVIEW, 6604
    - PRECANCEROUS CONDITIONS, 6790*
    - REVIEW, 6605
  - ESTRONE
    - REVIEW, 6605
    - SERUM LEVELS, 6786*
  - ESTRONE SULFATE
    - REVIEW, 6605
  - LEIOMYOSARCOMA
    - ULTRASTRUCTURAL STUDY, 7023*
  - MENOPAUSE
    - ESTRADIOL, 6786*
    - ESTRONE, 6786*
  - MESOTHELIOMA
    - EPIDEMIOLOGY, 7000
    - HISTOLOGICAL STUDY, 7000
  - NEOPLASMS, MULTIPLE PRIMARY
    - EPIDEMIOLOGY, 7103
  - SARCOMA
    - ULTRASTRUCTURAL STUDY, 7023*, 7024*

- VAGINAL NEOPLASMS
  - CARCINOMA, PAPILLARY
    - CASE REPORT, 6970
    - DIAGNOSIS AND TREATMENT, 6970
    - ULTRASTRUCTURAL STUDY, 6970

- VINCALEUKOBLASTINE
  - LUNG NEOPLASMS
    - SARCOMA, 6791*

- VINYL CHLORIDE
  - SEE ETHYLENE, CHLORO-

- VIRAL PROTEINS
  - BREAST NEOPLASMS
    - ISOLATION AND CHARACTERIZATION, 6894*
  - ESTRADIOL
    - UTERUS, MOUSE, 6898*
  - ETHANE, 1,1,1-TRICHLORO-2,2-BIS(P-CHLOROPHENYL)-
    - UTERUS, MOUSE, 6898*
  - MESTRANOL
    - UTERUS, MOUSE, 6898*
  - PREGN-4-ENE-3,20-DIONE, 17-(ACETYLOXY)-6-METHYL-, (6 ALPHA)-
    - UTERUS, MOUSE, 6898*
  - 4,4'-STILBENEDIOL, ALPHA,ALPHA'-DIETHYL-
    - UTERUS, MOUSE, 6898*
  - VIRUS, B77
    - GLUCOSE, 2-AMINO-2-DEOXY-, 6833
  - VIRUS, EPSTEIN-BARR
    - URIDINE, 2'-DEOXY-5-IODO-, 6907*
  - VIRUS, KIRSTEN MURINE SARCOMA-LEUKEMIA
    - CELL CYCLE KINETICS, 6841
    - CELL TRANSFORMATION, NEOPLASTIC, 6841
    - KIDNEY, RAT, 6841
  - VIRUS, POLYOMA, BK
    - ANTIBODIES, 6859
  - VIRUS, ROUS SARCOMA
    - GLUCOSE, 2-AMINO-2-DEOXY-, 6833

- VIRAL VACCINES
  - BURKITT'S LYMPHOMA
    - EPIDEMIOLOGY, REVIEW, 6615

- VIRUS, ABELSON MURINE LEUKEMIA
  - BONE MARROW CELLS
    - CELL TRANSFORMATION, NEOPLASTIC, 6884*
  - CELL TRANSFORMATION, NEOPLASTIC
    - STRAIN DIFFERENCE, 6884*
  - ETHANOL, 2-MERCAPTO-
    - CELL TRANSFORMATION, NEOPLASTIC, 6884*
  - LYMPHOMA
    - MURAMIDASE, 7187

- VIRUS, ADENO 1
  - VIRUS, ADENO-ASSOCIATED
    - ISOLATION AND CHARACTERIZATION, 6916*
    - VIRUS REPLICATION, 6916*

- VIRUS, ADENO 2
  - RNA, MESSENGER
    - CELL TRANSFORMATION, NEOPLASTIC, 6865
    - RNA-DNA HYBRIDIZATION, 6865
  - RNA, VIRAL
    - CELL TRANSFORMATION, NEOPLASTIC, 6865
    - RNA-DNA HYBRIDIZATION, 6865
  - VIRUS, ADENO-ASSOCIATED
    - ISOLATION AND CHARACTERIZATION, 6916*
    - VIRUS REPLICATION, 6916*

- VIRUS, ADENO-ASSOCIATED
  - VIRUS, ADENO 1
    - ISOLATION AND CHARACTERIZATION, 6916*
    - VIRUS REPLICATION, 6916*
  - VIRUS, ADENO 2
    - ISOLATION AND CHARACTERIZATION, 6916*
    - VIRUS REPLICATION, 6916*

- VIRUS, AVIAN ERYTHROBLASTIC LEUKOSIS
  - ANEMIA
    - VIRUS, HELPER, 6830
  - BONE MARROW CELLS
    - CELL TRANSFORMATION, NEOPLASTIC, 6830
  - FIBROBLASTS
    - CELL TRANSFORMATION, NEOPLASTIC, 6830
  - FIBROSARCOMA
    - VIRUS, HELPER, 6830
  - VIRUS, HELPER
    - CELL TRANSFORMATION, NEOPLASTIC, 6830

- VIRUS, AVIAN MYELOBLASTOSIS
  - CATIONS, DIVALENT
    - DNA REPLICATION, 6829
  - DNA POLYMERASE
    - BERYLLIUM, 6674
  - DNA REPLICATION

        BERYLLIUM, 6674
    DNA, VIRAL
        DNA-RNA HYBRIDIZATION, 6828
    LEUKEMIA
        DNA REPLICATION, 6828
        DNA, VIRAL, 6828
    MAGNESIUM
        DNA REPLICATION, 6829
    MANGANESE
        DNA REPLICATION, 6829
    POTASSIUM CHLORIDE
        DNA REPLICATION, 6829
    REVERSE TRANSCRIPTASE
        DNA REPLICATION, 6829
    RNA
        ESTROGENS, 6720
    VIRUS, ROUS SARCOMA
        DNA-RNA HYBRIDIZATION, 6828

VIRUS, B77
    GLUCOSE, 2-AMINO-2-DEOXY-
        VIRAL PROTEINS, 6833
        VIRUS REPLICATION, 6833

VIRUS, BABOON ENDOGENOUS
    LEUKEMIA, MYELOCYTIC
        DNA-RNA HYBRIDIZATION, REVIEW, 6899*

VIRUS, C-TYPE RNA TUMOR
    CELL TRANSFORMATION, NEOPLASTIC
        XENOTROPIC AND ECOTROPIC VIRUSES, REVIEW, 6619
    ESTROGENS
        VIRUS REPLICATION, 6898*
    LEUKEMIA
        REVERSE TRANSCRIPTASE, REVIEW, 6875
    MYELOFIBROSIS
        REVERSE TRANSCRIPTASE, REVIEW, 6875
    VIRUS REPLICATION
        XENOTROPIC AND ECOTROPIC VIRUSES, REVIEW, 6619

VIRUS, CYTOMEGALO
    LYMPHOMA
        ANTIBODIES, VIRAL, 6867

VIRUS, EPSTEIN-BARR
    ADENOCARCINOMA
        ANTIBODIES, 6905*
    ANTIGENS, VIRAL
        ANTIBODIES, 6905*
        PHOSPHONIC ACIDS, 6866
    BURKITT'S LYMPHOMA
        ANTIBODIES, 6905*
        EPIDEMIOLOGY, REVIEW, 6615
    CYCLOHEXIMIDE
        VIRUS REPLICATION, 6907*
    DNA, VIRAL
        DNA-RNA HYBRIDIZATION, 6907*
        MOLECULAR PROBES, 6622
        PHOSPHONIC ACIDS, 6866
    HODGKIN'S DISEASE
        ANTIBODIES, 6905*
    INFECTIOUS MONONUCLEOSIS
        ANIMAL MODE, MARMOSET, 6868
        ANTIBODIES, 6905*
        HODGKIN'S DISEASE, 7084*
        PHARYNX, 6908*
        SALIVA, 6908*
        VIRUS, SHEDDING, 6908*
    LYMPHOCYTES
        CELL TRANSFORMATION, NEOPLASTIC, 6906*
        LEUKEMIA, LYMPHOCYTIC, 6906*
    LYMPHOID TISSUE
        PRECANCEROUS CONDITIONS, 6868
    LYMPHOMA
        ANTIBODIES, VIRAL, 6867
        ANTIGENS, VIRAL, 6867
    MARMOSETS
        ANTIGEN-ANTIBODY REACTIONS, 6868
        PRECANCEROUS CONDITIONS, 6868
    PHOSPHONIC ACIDS
        LYMPHOCYTE TRANSFORMATION, 6866
    SALIVA
        HORIZONTAL TRANSMISSION, 6908*
    SARCOMA, KAPOSI'S
        ANTIBODIES, VIRAL, 6965
        TRANSPLANTATION, HOMOLOGOUS, 6965
    URIDINE, 2'-DEOXY-5-IODO-
        VIRAL PROTEINS, 6907*
    VIRUS REPLICATION
        RAJI CELLS, 6907*

VIRUS, FRIEND MURINE LEUKEMIA
    ACRIDINE, 3,6-DIAMINO-
        ERYTHROPOIESIS, 6837
    AMMONIUM
        PURINES, 6836
    DNA, VIRAL
        HOST RESTRICTION, 6835
    ERYTHROLEUKEMIA
        PENTOSEPHOSPHATES, 6836
        PURINES, 6836
    ERYTHROPOIESIS
        CELL CYCLE KINETICS, 6837
    GLUTAMINE
        PURINES, 6836
    INTERFERON
        ERYTHROPOIESIS, 6886*
        HEMOGLOBINS, 6886*
        VIRUS REPLICATION, 6886*
    METHANE, SULFINYLBIS-
        ERYTHROPOIESIS, 6837
        HEMOGLOBINS, 6837
        PENTOSEPHOSPHATES, 6836
        PURINES, 6836
    SPLEEN
        ANTIGENS, NEOPLASM, 6885*
        CELL TRANSFORMATION, NEOPLASTIC, 6885*
        SURFACE PROPERTIES, 6885*
    THYMIDINE
        ERYTHROPOIESIS, 6837
    VIRUS, NEWCASTLE DISEASE
        INTERFERON, 6886*

VIRUS, FROG 3
    POLY A
        CYTOPLASM, 6834
        VIRUS REPLICATION, 6834
    RNA, MESSENGER
        ISOLATION AND CHARACTERIZATION, 6834
        POLY A, 6834

- VIRUS, GENITAL WART
  - CERVIX NEOPLASMS
    - CARCINOGENIC POTENTIAL, 6617
  - UROGENITAL NEOPLASMS
    - CARCINOMA, 6617

- VIRUS, GIBBON LYMPHOMA
  - ANTIGENS, VIRAL
    - ANTIBODY SPECIFICITY, 6857
    - ANTIGENIC DETERMINANTS, 6857

- VIRUS, GRCSS MURINE LEUKEMIA
  - LYMPHOMA
    - IMMUNITY, CELLULAR, 6919, 6937*
    - IMMUNITY, PASSIVE, 6937*

- VIRUS, HAMSTER LEUKEMIA
  - RNA, VIRAL
    - POLYNUCLEOTIDES, 6891*

- VIRUS, HELPER
  - ANEMIA
    - VIRUS, AVIAN ERYTHROBLASTIC LEUKOSIS, 6830
  - FIBROSARCOMA
    - VIRUS, AVIAN ERYTHROBLASTIC LEUKOSIS, 6830
  - VIRUS, AVIAN ERYTHROBLASTIC LEUKOSIS
    - CELL TRANSFORMATION, NEOPLASTIC, 6830

- VIRUS, HERPES
  - BLADDER NEOPLASMS
    - VIRUS-LIKE PARTICLES, 6992

- VIRUS, HERPES SAIMIRI
  - ANTIBCDIES, VIRAL
    - OWL MONKEY, 6913*
  - DNA, VIRAL
    - ENDONUCLEASES, 6869
    - ISOLATION AND CHARACTERIZATION, 6869
    - ULTRASTRUCTURAL STUDY, 6869
  - LEUKEMIA, LYMPHOCYTIC
    - MARMOSETS, 6913*
  - LYMPHOMA
    - ANTIBODY FORMATION, 6914*
    - HISTOLOGICAL STUDY, RABBIT, 6914*
    - IMMUNE RESPONSE, 6914*
  - VIRUS REPLICATION
    - OWL MONKEY, 6913*

- VIRUS, HERPES SIMPLEX
  - CELL FUSION
    - THYMIDINE KINASE, 6870
  - MUTAGENS
    - THYMIDINE KINASE, 6870
  - THYMIDINE KINASE
    - CELL TRANSFORMATION, NEOPLASTIC, 6870
    - REACTIVATION, 6870

- VIRUS, HERPES SIMPLEX 1
  - ALPHA-AMANITINE
    - RNA REPLICATION, 6873
  - ARGININE
    - RNA REPLICATION, 6873
  - DNA, VIRAL
    - DNA REPLICATION, 6871
    - SEQUENCE HOMOLOGY, 6909*
    - ULTRASTRUCTURAL STUDY, 6909*
  - LYMPH NODES
    - LYMPHOCYTE TRANSFORMATION, 6872
  - LYMPHOCYTE TRANSFORMATION
    - IMMUNITY, CELLULAR, 6872
  - LYMPHOMA
    - ANTIBODIES, VIRAL, 6867
  - RNA POLYMERASE
    - RNA REPLICATION, 6873
  - RNA, VIRAL
    - DNA-RNA HYBRIDIZATION, 6873
  - SILVER NITRATE
    - AGGLUTINATION, 6910*
    - CYTOPATHOGENIC EFFECT, VIRAL, 6910*
    - VIRUS REPLICATION, 6910*

- VIRUS, HERPES SIMPLEX 2
  - CELL TRANSFORMATION, NEOPLASTIC
    - ULTRASTRUCTURAL STUDY, 6912*
  - CERVIX NEOPLASMS
    - CARCINOGENIC POTENTIAL, 6617
    - CARCINOMA, 6622
  - DNA REPLICATION
    - DOSE-RESPONSE STUDY, 6912*
  - DNA, VIRAL
    - DNA REPLICATION, 6912*
  - LYMPH NODES
    - LYMPHOCYTE TRANSFORMATION, 6872
  - LYMPHOCYTE TRANSFORMATION
    - IMMUNITY, CELLULAR, 6872
  - SILVER NITRATE
    - AGGLUTINATION, 6910*
    - CYTOPATHOGENIC EFFECT, VIRAL, 6910*
    - VIRUS REPLICATION, 6910*
  - UROGENITAL NEOPLASMS
    - CARCINOGENIC POTENTIAL, 6617
    - CARCINOMA, 6617

- VIRUS, JC PAPOVA
  - PINEALOMA
    - CELL DIFFERENTIATION, 6903*
    - ULTRASTRUCTURAL STUDY, HAMSTER, 6903*

- VIRUS, KIRSTEN MURINE SARCOMA
  - DEXAMETHASONE
    - VIRUS REPLICATION, 6897*
  - INTERFERON
    - VIRUS REPLICATION, 6897*
  - URIDINE, 2'-DEOXY-5-IODO-
    - VIRUS REPLICATION, 6897*

- VIRUS, KIRSTEN MURINE SARCOMA-LEUKEMIA
  - VIRAL PROTEINS
    - CELL CYCLE KINETICS, 6841
    - CELL TRANSFORMATION, NEOPLASTIC, 6841
    - KIDNEY, RAT, 6841

- VIRUS, LACTATE DEHYDROGENASE
  - ANTIGENS, HETEROGENETIC
    - ANTIBODY FORMATION, 6915*
  - ASPARAGINASE
    - ANTIBODY FORMATION, 6915*
  - LEUKEMIA
    - IMMUNE RESPONSE, 6915*

    B-LYMPHOCYTES
        ANTIBODY FORMATION, 6915*
    VIRUS REPLICATION
        ANTIBODY FORMATION, 6915*

VIRUS, LEOPARD FROG CARCINOMA
    KIDNEY NEOPLASMS
        ADENOCARCINOMA, 7196*
        AMINO ACIDS, 7196*
        CARBOXYLIC ACIDS, 7196*
        CELLULAR INCLUSIONS, 7196*
        GLYCOGEN, 7196*
        NUCLEIC ACIDS, 7196*
        SULFHYDRYL COMPOUNDS, 7196*

VIRUS-LIKE PARTICLES
    BLADDER NEOPLASMS
        CASE REPORT, 6992
        VIRUS, HERPES, 6992
    LYMPHOSARCOMA
        FISHES, 7096*
    NEOPLASM METASTASIS
        VERTICAL TRANSMISSION, HAMSTER, 7199*
    PINEALOMA
        CYTOPLASM, 6895*
        ULTRASTRUCTURAL STUDY, 6895*
    SARCOMA, OSTEOGENIC
        RADIATION, IONIZING, 6896*
        RADIUM, 6896*
    VIRUS, RNA TUMOR
        CELL TRANSFORMATION, NEOPLASTIC, 6900*
        DNA, 6900*
        LYMPHOCYTES, 6900*
        NEOPLASMS, 6900*
        RNA, 6900*

VIRUS, MOLONEY MURINE LEUKEMIA
    ETHIDIUM BROMIDE
        RNA, VIRAL, 6849
    MICROSOMES, LIVER
        RNA, VIRAL, 6849
    RIBONUCLEASE
        RNA, VIRAL, 6849
    VIRUS REPLICATION
        CELL TRANSFORMATION, NEOPLASTIC, 6883*

VIRUS, MOLONEY MURINE SARCOMA
    ANTIGENS, NEOPLASM
        IMMUNITY, CELLULAR, 6850
    IMMUNITY, CELLULAR
        LYMPHOCYTE CULTURE TEST, MIXED, 6850
    T-LYMPHOCYTES
        ANTILYMPHOCYTE SERUM, 6850
        IMMUNITY, CELLULAR, 6850
    MITOMYCIN C
        LYMPHOCYTE CULTURE TEST, MIXED, 6850
    SPLEEN
        IMMUNITY, CELLULAR, 6850
    VIRUS, RAUSCHER MURINE LEUKEMIA
        ANTIGENIC DETERMINANTS, 6850

VIRUS, MURINE LEUKEMIA
    AGE FACTORS
        CELL TRANSFORMATION, NEOPLASTIC, 6838
        VIRUS REPLICATION, 6838
    ANTIGENS
        IMMUNIZATION, 6843
    LEUKEMIA, LYMPHOCYTIC
        AGE FACTORS, 6996
        THYMUS NEOPLASMS, 6996
    RADIATION, IONIZING
        VIRUS REPLICATION, 6842
    SEX FACTORS
        CELL TRANSFORMATION, NEOPLASTIC, 6838
        VIRUS REPLICATION, 6838
    VIRUS, MURINE MAMMARY TUMOR
        ANTIBODY SPECIFICITY, 6847
    VIRUS REPLICATION
        ORGAN DISTRIBUTION, 6838

VIRUS, MURINE MAMMARY TUMOR
    AGE FACTORS
        ANTIGEN-ANTIBODY COMPLEX, 6848
    ANTIBODIES, VIRAL
        DOSE-RESPONSE STUDY, 6847
        IMMUNE RESPONSE, 6847
        STRAIN DIFFERENCES, 6847
    BREAST NEOPLASMS
        ANTIGENIC DETERMINANTS, 6894*
        LEUKOCYTE MIGRATION INHIBITION, 6894*
    DNA NUCLEOTIDYLTRANSFERASES
        DNA REPLICATION, 6893*
        ISOLATION AND CHARACTERIZATION, 6893*
        PEPTIDES, 6893*
    KIDNEY
        ANTIGEN-ANTIBODY COMPLEX, 6848
    REVERSE TRANSCRIPTASE
        RNA, 6645*
    TRYPSIN
        PEPTIDES, 6892*
        ULTRASTRUCTURAL STUDY, 6892*
        VIRUS REPLICATION, 6892*
    VIRUS, MURINE LEUKEMIA
        ANTIBODY SPECIFICITY, 6847

VIRUS, MURINE SARCOMA
    ANTIBODIES, NEOPLASM
        ANTIBODY SPECIFICITY, 6922
    ANTIGENIC DETERMINANTS
        IMMUNE SERUMS, 6922
    IMMUNE SERUMS
        ANTIBODY SPECIFICITY, 6922
        IMMUNOGLOBULINS, 6922
    RNA, VIRAL
        POLYNUCLEOTIDES, 6891*

VIRUS, NEWCASTLE DISEASE
    VIRUS, FRIEND MURINE LEUKEMIA
        INTERFERON, 6886*

VIRUS, PAPILLOMA
    WARTS
        TRANSPLANTATION, 6904*

VIRUS, PAPOVA
    ANTIGENS, VIRAL
        CELL TRANSFORMATION, NEOPLASTIC, 6858
        MACACA SPECIOSA

ISOLATION AND CHARACTERIZATION, 6860
SKIN NEOPLASMS
MELANOMA, 6902*

VIRUS, PAPOVA, BK
ANTIGENS, VIRAL
CELL TRANSFORMATION, NEOPLASTIC, 6858

VIRUS, POLYOMA
ENDONUCLEASES
RNA, MESSENGER, 6861
GLYCOPROTEINS
CELL TRANSFORMATION, NEOPLASTIC, 6864
HISTONES
DNA REPLICATION, 6862
HYALURONIDASE
GLYCOPROTEINS, 6864
MUCOPOLYSACCHARIDES, 6864
IMMUNITY, CELLULAR
TRANSPLANTATION IMMUNOLOGY, 6901*
MUCOPOLYSACCHARIDES
CELL TRANSFORMATION, NEOPLASTIC, 6864
NUCLEOPROTEINS
DNA REPLICATION, 6862
RNA, MESSENGER
DNA-RNA HYBRIDIZATION, 6861
ISOLATION AND CHARACTERIZATION, 6861
RNA POLYMERASE
DNA REPLICATION, 6862
RNA, VIRAL
ISOLATION AND CHARACTERIZATION, 6863
POLY A, 6863
TERATOID TUMOR
URIDINE, 5-BROMO-2'-DEOXY-, 6978
VIRUS REPLICATION, 6978
TRANSPLANTATION, HOMOLOGOUS
CELL TRANSFORMATION, NEOPLASTIC, 6933*
URIDINE, 2'-DEOXY-5-FLUORO-
RNA REPLICATION, 6863

VIRUS, POLYOMA, BK
ANTIBODIES
ANTIGENS, VIRAL, 6859
VIRAL PROTEINS, 6859
VIRUS, STUMPTAILED MACAQUE
ANTIGENIC DETERMINANTS, 6860

VIRUS, RADIATION LEUKEMIA
BONE MARROW CELLS
CELL TRANSFORMATION, NEOPLASTIC, 6839
VIRUS REPLICATION, 6840
LEUKEMIA, LYMPHOCYTIC
ANTIGENS, 6929
HISTOCOMPATIBILITY ANTIGENS, 6929
LYMPHOMA
RADIATION, IONIZING, 6839
RADIATION, IONIZING
ANTIGENS, VIRAL, 6840
CELL TRANSFORMATION, NEOPLASTIC, 6839
VIRUS REPLICATION, 6840
SPLEEN
VIRUS REPLICATION, 6840
THYMOMA
INTRACELLULAR FLUID, 7200*
THYMUS NEOPLASMS
CELL TRANSFORMATION, NEOPLASTIC, 6839

VIRUS, RAUSCHER MURINE LEUKEMIA
ERYTHROCYTES
AGGLUTINATION, 6846
ANTIGENS, VIRAL, 6845
CELL MEMBRANE, 6846
CONCANAVALIN A, 6846
PLANT AGGLUTININS, 6846
VIRUS REPLICATION, 6846
ERYTHROPOIESIS
IRON INCORPORATION, 6844
ERYTHROPOIETIN
DOSE-RESPONSE STUDY, 6844
FREUND'S ADJUVANT
CELL TRANSFORMATION, NEOPLASTIC, 6889*
ERYTHROPOIESIS, 6889*
GLYCOPROTEINS
FUCOSE, 6890*
GLUCOSAMINE, 6890*
METHIONINE, 6890*
LEUKEMIA
ANTIGENS, VIRAL, 6845
OVUM
RNA REPLICATION, 6888*
PEPTIDES
ANTIGENIC DETERMINANTS, 6888*
ISOLATION AND CHARACTERIZATION, 6888*
RNA REPLICATION, 6888*
RETICULOCYTES
RNA REPLICATION, 6888*
REVERSE TRANSCRIPTASE
ISOLATION, PROCEDURE, 6887*
RNA, VIRAL
POLYNUCLEOTIDES, 6891*
SPLEEN
ERYTHROPOIESIS, 6844
VIRUS, MOLONEY MURINE SARCOMA
ANTIGENIC DETERMINANTS, 6850

VIRUS REPLICATION
ESTROGENS
VIRUS, C-TYPE RNA TUMOR, 6898*
TERATOID TUMOR
VIRUS, POLYOMA, 6978
VIRUS, SV40, 6978
VIRUS, ADENO 1
VIRUS, ADENO-ASSOCIATED, 6916*
VIRUS, ADENO 2
VIRUS, ADENO-ASSOCIATED, 6916*
VIRUS, B77
GLUCOSE, 2-AMINO-2-DEOXY-, 6833
VIRUS, C-TYPE RNA TUMOR
XENOTROPIC AND ECOTROPIC VIRUSES, REVIEW, 6619
VIRUS, EPSTEIN-BARR
CYCLOHEXIMIDE, 6907*
RAJI CELLS, 6907*
VIRUS, FRIEND MURINE LEUKEMIA
INTERFERON, 6886*
VIRUS, FROG 3

    - POLY A, 6834
  - VIRUS, HERPES SAIMIRI
    - OWL MONKEY, 6913*
  - VIRUS, HERPES SIMPLEX 1
    - NITRIC ACID, SILVER SALT, 6910*
  - VIRUS, HERPES SIMPLEX 2
    - NITRIC ACID, SILVER SALT, 6910*
  - VIRUS, KIRSTEN MURINE SARCOMA
    - DEXAMETHASONE, 6897*
    - INTERFERON, 6897*
    - URIDINE, 2'-DEOXY-5-IODO-, 6897*
  - VIRUS, LACTATE DEHYDROGENASE
    - ANTIBODY FORMATION, 6915*
  - VIRUS, MOLONEY MURINE LEUKEMIA
    - CELL TRANSFORMATION, NEOPLASTIC, 6883*
  - VIRUS, MURINE LEUKEMIA
    - AGE FACTORS, 6838
    - ORGAN DISTRIBUTION, 6838
    - RADIATION, IONIZING, 6842
    - SEX FACTORS, 6838
  - VIRUS, MURINE MAMMARY TUMOR
    - TRYPSIN, 6892*
  - VIRUS, RADIATION LEUKEMIA
    - BONE MARROW CELLS, 6840
    - RADIATION, IONIZING, 6840
    - SPLEEN, 6840
  - VIRUS, RAUSCHER MURINE LEUKEMIA
    - ERYTHROCYTES, 6846
  - VIRUS, RNA TUMOR
    - HYBRID CELLS, 6663*
  - VIRUS, ROUS SARCOMA
    - GLUCOSE, 2-AMINO-2-DEOXY-, 6833
    - TEMPERATURE SENSITIVE MUTANTS, 6831
  - VIRUS, SV40
    - CELL TRANSFORMATION, NEOPLASTIC, 6883*
    - DNA, VIRAL, 6856
  - VIRUS, VISNA
    - ISOLATION AND CHARACTERIZATION, 6917*
    - REVIEW, 6618

VIRUS, RNA TUMOR
  - HYBRID CELLS
    - CELL TRANSFORMATION, NEOPLASTIC, 6663*
    - REVIEW, 6663*
    - VIRUS REPLICATION, 6663*
  - LEUKEMIA
    - PRECANCEROUS CONDITIONS, 6613
  - VIRUS-LIKE PARTICLES
    - CELL TRANSFORMATION, NEOPLASTIC, 6900*
    - DNA, 6900*
    - LYMPHOCYTES, 6900*
    - NEOPLASMS, 6900*
    - RNA, 6900*

VIRUS, ROUS SARCOMA
  - ANTIGENS
    - CELL TRANSFORMATION, NEOPLASTIC, 6647*
  - CELL MEMBRANE
    - BINDING, 6877*
    - CELL TRANSFORMATION, NEOPLASTIC, 6647*
  - CELL TRANSFORMATION, NEOPLASTIC
    - TEMPERATURE SENSITIVE MUTANTS, 6831
  - CHROMOSOME ABERRATIONS
    - CELL TRANSFORMATION, NEOPLASTIC, 6650*
  - DEOXYRIBONUCLEASE
    - BINDING, 6877*
  - DNA REPLICATION
    - NEURORETINAL CELLS, 6831
  - GLUCOSE, 2-AMINO-2-DEOXY-
    - VIRAL PROTEINS, 6833
    - VIRUS REPLICATION, 6833
  - GLYCOPROTEINS
    - CELL TRANSFORMATION, NEOPLASTIC, 6864
  - HYALURONIDASE
    - GLYCOPROTEINS, 6864
    - MUCOPOLYSACCHARIDES, 6864
  - IMMUNITY
    - NEOPLASM REGRESSION, 6832
  - IMMUNITY, CELLULAR
    - NEOPLASM REGRESSION, 6832
  - MUCOPOLYSACCHARIDES
    - CELL TRANSFORMATION, NEOPLASTIC, 6864
  - NEURAMINIDASE
    - BINDING, 6877*
  - OLIGONUCLEOTIDES
    - REPLICATION-DEFECTIVE DELETION MUTANTS, 6876*
  - PRONASE
    - BINDING, 6877*
  - RIBONUCLEASE
    - BINDING, 6877*
  - RNA, VIRAL
    - OLIGONUCLEOTIDES, 6876*
    - REPLICATION-DEFECTIVE DELETION MUTANTS, 6876*
  - TRYPSIN
    - BINDING, 6877*
  - VIRUS, AVIAN MYELOBLASTOSIS
    - DNA-RNA HYBRIDIZATION, 6828
  - VIRUS REPLICATION
    - TEMPERATURE SENSITIVE MUTANTS, 6831

VIRUS, SIMIAN SARCOMA
  - LEUKEMIA, MYELOCYTIC
    - DNA-RNA HYBRIDIZATION, REVIEW, 6899*
    - DOUBLE INFECTION THEORY, REVIEW, 6899*

VIRUS, STUMPTAILED MACAQUE
  - DNA, VIRAL
    - ISOLATION AND CHARACTERIZATION, 6860
  - VIRUS, POLYOMA, BK
    - ANTIGENIC DETERMINANTS, 6860
  - VIRUS, SV40
    - ANTIGENIC DETERMINANTS, 6860

VIRUS, SV40
  - ANTIGENS
    - CELL TRANSFORMATION, NEOPLASTIC, 6647*
  - ANTIGENS, NEOPLASM
    - ANTIGEN-ANTIBODY REACTIONS, 6853
    - ANTIGENIC DETERMINANTS, 6853

        ISOLATION AND CHARACTERIZATION, 6853
    ANTIGENS, VIRAL
        CELL TRANSFORMATION, NEOPLASTIC, 6852, 6858, 6878*
        ISOLATION AND CHARACTERIZATION, 6878*
    BENZ(A)ANTHRACENE, 7,12-DIMETHYL-
        CELL TRANSFORMATION, NEOPLASTIC, 6751*
    BENZO(A)PYRENE
        CELL TRANSFORMATION, NEOPLASTIC, 6751*
    CELL MEMBRANE
        CELL TRANSFORMATION, NEOPLASTIC, 6647*
        TEMPERATURE SENSITIVE MUTANTS, 6882*
    CELL TRANSFORMATION, NEOPLASTIC
        C-TYPE PARTICLES, 6852
        DNA REPLICATION, 6880*
        FIBROBLASTS, REVIEW, 6646*
        TEMPERATURE SENSITIVE MUTANTS, 6882*
        TISSUE CULTURE, 6852
    CHOLESTEROL
        CELL TRANSFORMATION, NEOPLASTIC, 6911*
    CHROMOSOMES
        CELL TRANSFORMATION, NEOPLASTIC, 6879*
        REVERTANT CELL LINES, 6879*
    DNA
        CELL TRANSFORMATION, NEOPLASTIC, 6879*
        REVERTANT CELL LINES, 6879*
    DNA, CIRCULAR
        DNA REPLICATION, 6854
    DNA REPLICATION
        CELL TRANSFORMATION, NEOPLASTIC, 6855, 6881*
        DELETION MUTANTS, 6854
        FIBROBLASTS, REVIEW, 6646*
    DNA, VIRAL
        CELL TRANSFORMATION, NEOPLASTIC, 6851
        DELETION MUTANTS, 6854
        ISOLATION AND CHARACTERIZATION, 6856
        VIRUS REPLICATION, 6856
    ENDONUCLEASES
        DNA, CIRCULAR, 6854
    GLYCOLIPIDS
        TEMPERATURE SENSITIVE MUTANTS, 6882*
    GLYCOPEPTIDES
        TEMPERATURE SENSITIVE MUTANTS, 6882*
    LIPOPROTEINS
        CELL TRANSFORMATION, NEOPLASTIC, 6911*
    MITOSIS
        CELL TRANSFORMATION, NEOPLASTIC, 6855
        ULTRASTRUCTURAL STUDY, 6855
    OXIDOREDUCTASES
        CELL TRANSFORMATION, NEOPLASTIC, 6911*
    POLYPLOIDY
        CELL TRANSFORMATION, NEOPLASTIC, 6881*
    POTASSIUM
        CELL TRANSFORMATION, NEOPLASTIC, 7158
        TRANSPORT, CELL MEMBRANE, 7158
    RNA, MESSENGER
        CELL TRANSFORMATION, NEOPLASTIC, 6851
    RNA, VIRAL
        CELL TRANSFORMATION, NEOPLASTIC, 6851, 6852
    SARCOMA
        ANTIGENS, NEOPLASM, 6853
    TERATOID TUMOR
        URIDINE, 5-BROMO-2'-DEOXY-, 6978
        VIRUS REPLICATION, 6978
    VIRUS REPLICATION
        CELL TRANSFORMATION, NEOPLASTIC, 6883*
    VIRUS, STUMPTAILED MACAQUE
        ANTIGENIC DETERMINANTS, 6860

VIRUS, VACCINIA
    RNA, MESSENGER
        POLY A, 6834

VIRUS, VARICELLA ZOSTER
    LYMPHOMA
        ANTIBODIES, VIRAL, 6867

VIRUS, VISNA
    IMMUNITY, CELLULAR
        REVIEW, 6618
    NERVOUS SYSTEM DISEASES
        REVIEW, 6618
    REVERSE TRANSCRIPTASE
        REVIEW, 6618
    VIRUS REPLICATION
        ISOLATION AND CHARACTERIZATION, 6917*
        REVIEW, 6618

VIRUS, WOOLLY MONKEY
    ANTIGENS, VIRAL
        ANTIBODY SPECIFICITY, 6857
        ANTIGENIC DETERMINANTS, 6857
    LEUKEMIA, MYELOBLASTIC
        ANTIGENS, VIRAL, 6857
    LEUKEMIA, MYELOCYTIC
        ANTIGENS, VIRAL, 6857

VITAMIN E
    MICROSOMES, LIVER
        PEROXIDASES, 6750*

VULVAR NEOPLASMS
    PAGET'S DISEASE, EXTRA-MAMMARY
        EPIDEMIOLOGY, 7135*
        MUCOPOLYSACCHARIDES, 7135*
        NEOPLASM METASTASIS, 7135*
        NEOPLASM RECURRENCE, LOCAL, 7135*

WARTS
    VIRUS, PAPILLOMA
        TRANSPLANTATION, 6904*

WATER POLLUTANTS
    ANTIPYRINE, 4-AMINO-

        - ANILINE, 6688
        - ANILINE, M-CHLORO-, 6688
        - ANILINE, O-CHLORO-, 6688
        - 2,4-XYLIDINE, 6688
        - 2,5-XYLIDINE, 6688
        - 2,6-XYLIDINE, 6688
        - O-TOLUIDINE, 6688
        - M-TOLUIDINE, 6688
        - P-TOLUIDINE, 6688
    - BARBITURIC ACID, 5,5-DIETHYL-
        - ISOLATION AND CHARACTERIZATION, 7150*
    - ETHER, BIS(CHLOROMETHYL)-
        - ISOLATION AND CHARACTERIZATION, 7150*
    - GASTROINTESTINAL NEOPLASMS
        - ASBESTOS, 7149*
        - EPIDEMIOLOGY, 7149*
    - PALMITIC ACID
        - ISOLATION AND CHARACTERIZATION, 7150*
    - PHENOL, 2,4,6-TRICHLORO-
        - ISOLATION AND CHARACTERIZATION, 7150*
    - PHTHALIC ACID, BENZYL BUTYL ESTER
        - ISOLATION AND CHARACTERIZATION, 7150*
    - PHTHALIC ANHYDRIDE
        - ISOLATION AND CHARACTERIZATION, 7150*
    - RADIOISOTOPES
        - CARCINOGENIC POTENTIAL, REVIEW, 6644*

- WERNER'S SYNDROME
    - OVARIAN NEOPLASMS
        - CASE REPORT, 7027*

- WOOD
    - NOSE NEOPLASMS
        - DUST, 7115
        - OCCUPATIONAL HAZARD, 7115

- WOUNDS AND INJURIES
    - BONE NEOPLASMS
        - FIBROSARCOMA, 6803
        - RHABDOMYOSARCOMA, 6803
    - BRAIN NEOPLASMS
        - CASE REPORT, 7050*
        - GLIOBLASTOMA MULTIFORME, 7050*
    - TURBELLARIA
        - CELL TRANSFORMATION, NEOPLASTIC, 7097*

- XERODERMA PIGMENTOSUM
    - DNA REPAIR
        - COLONY FORMATION, 6796
        - COMPLEMENTATION GROUP, 6794, 6796
    - FIBROBLASTS
        - DNA REPAIR, 6794
    - HYBRID CELLS
        - DNA REPAIR, 6794
    - ULTRAVIOLET RAYS
        - COLONY FORMATION, 6796
        - DNA REPAIR, 6794, 6796
        - ENDONUCLEASES, 6793
        - PYRIMIDINE DIMERS, 6793

- 2,4-XYLIDINE
    - WATER POLLUTANTS
        - ANTIPYRINE, 4-AMINO-, 6688

- 2,5-XYLIDINE
    - WATER POLLUTANTS
        - ANTIPYRINE, 4-AMINO-, 6688

- 2,6-XYLIDINE
    - WATER POLLUTANTS
        - ANTIPYRINE, 4-AMINO-, 6688

- ZOLLINGER-ELLISON SYNDROME
    - DUODENAL NEOPLASMS
        - CASE REPORT, 7089*
        - GASTRIN, 7089*
    - ISLET CELL TUMOR
        - CASE REPORT, 7089*
    - PANCREATIC NEOPLASMS
        - GASTRIN, 7089*

CHEMICAL ABSTRACT SERVICES REGISTRY NUMBER INDEX

CAS REGISTRY NUMBER	ABSTRACT NUMBER
36066	7158
50066	6690, 6691, 6707
50077	6683, 6850
50099	6694
50180	6719, 7159
50237	7190
50271	6605
50282	6605, 6682, 6716, 6721, 6722, 6783, 7192
50328	6641, 6681, 6691, 6694, 6695, 6696, 6697, 6698, 6699, 6700, 6701, 6702, 6709, 6713, 6976
50760	6391, 6631, 7166
50817	6678
50895	6837, 7179
50919	6863
51796	6602, 6717
53032	6965
53 065	6929
53167	6605
53430	7191
53703	6641
53952	6678
53963	6631, 6676
54319	7158
54364	6690
54422	7159
54853	6706
55185	6002, 6707, 6708, 6709
55801	6671, 6686, 6687
56235	6707
56291	6707
56495	6641, 6691, 6692, 6695, 6697, 6698, 6713, 6924
56531	6716, 6721, 6722
56553	6641, 6695
56575	6711
56859	6836
57636	6669
57830	6682, 7192
57885	5772
57976	6641, 6681, 6682, 6689, 6713
58082	6714
58559	6641
59143	6633, 6715, 6978, 7179
60117	6675

CHEMICAL ABSTRACT SERVICES REGISTRY NUMBER INDEX

CAS REGISTRY NUMBER	ABSTRACT NUMBER
60151	6690
60333	6678
62500	6667, 6713, 6715
62533	6688, 6694
62680	6690
62759	6602, 6710, 6712, 6714
63058	6605
63741	6690
63912	6689
64868	6682
66273	6713
66819	6717
67685	6836, 6837
69056	6711
70188	6669
70257	6713, 6715
71443	7177
73405	6710
74793	6873
75014	6671, 6672
76584	6690, 6694
77781	6718
80080	6690
80159	6691
83078	6688
83443	6665
84173	6716
85018	6641, 6713
87627	6688
92626	6837
95512	6688
95534	6688
95681	6688
95783	6688
97563	6602
100016	6688
106478	6688, 6690
106490	6688
108429	6688
108441	6688
115866	6689
120127	6713
121697	6091
124209	7177

CHEMICAL ABSTRACT SERVICES REGISTRY NUMBER INDEX

CAS REGISTRY NUMBER	ABSTRACT NUMBER
129000	6641
192972	6713
218019	6641, 6695
304289	6676, 6679
438675	6605
446866	6965
477305	7152, 7157
526830	6997
540738	6703, 6704
630080	6691
684935	6713, 6718
759739	6713
797637	6669
908350	6690
1162658	6666, 6668, 6669
1239458	6849, 7173
1332214	6606, 6670, 7019, 7119, 7121
1332587	7019
1344281	6701
2541697	6641
3416248	6833
3689245	6690
3731393	6677
3754473	6691
4637563	6711
6098448	6678, 6795
6325548	6685
6872066	6690
7220817	6666
7292526	6678
7439921	7118
7439954	6829
7439965	6829
7440097	7158
7440291	6673
7440359	6797, 6798
7440417	6674
7440611	7116
7440702	7160, 7161
7447407	6828, 6829
7553562	6639
7723140	6959
8063943	6672

CHEMICAL ABSTRACT SERVICES REGISTRY NUMBER INDEX

CAS REGISTRY NUMBER	ABSTRACT NUMBER
9002624	6682
9002862	6672
9004108	6637, 6682
9005496	7159
9008111	6925
10034772	7019
10540291	6783
12001284	6606, 6670, 7019, 7119, 7121
12001295	6606, 6670, 7019, 7119, 7121
12035722	7161
12172735	6606, 6670, 7019, 7119, 7121
13056989	6705
13345238	6699
13345625	6685
13823295	6673
14265442	6689
14596102	6797, 6798
14798039	6836
15676161	6642
16561298	6681
16812547	7161
17068789	6606, 6670, 7019, 7119, 7121
21150209	6873
24554265	6683
25267247	6678
25843452	6703
27591691	6694
74400439	7120

N	ABSTRACT NUMBER
	6797, 6798
	6674
	7160, 7161
	7120
	6639
.G	6828, 6829
	7158
	6829
	6829
3.S2	7161
	6959
	7118
	6673
	7116
	6691
GG	6707
1	6671, 6672
656 HHJ EMV1	6631, 6676
656 HHJ EMV1 KMV1	6676, 6679
656 HHJ ENO	6678
656 HHJ ENQV1	6678
666J	6641, 6713

WLN	ABSTRACT NUMBER
L B677 MV&T&J C01 D01 E01 JMV1 N01	6682
L B677 MV&T&J C01 D01 E01 JM1 N01	7157
L C666J	6713
L D6 B666J	6641, 6695
L D6 B666J C J	6641, 6681, 6682, 6689, 6713
L D6 B666J J	6641
L D6 B6666 2AB TJ	6641, 6681, 6691, 6694, 6695, 6696, 6697, 6698, 6699, 6700, 6701, 6702, 6709, 6713, 6976
L E5 B666 FV OV MUTJ A E	6605
L E5 B666 FVTTT&J E OQ	6605
L E5 B666 OV MUTJ A CQ E FV1Q FQ -B&ACEF	7190
L E5 B666 OV MUTJ A E FV1 -B&AEF	6682, 7192
L E5 B666 OV MUTJ E2 FQ F1UU1 -B&EF	6669
L E5 B666TJ A DQ FY2VR OQ	6665
L E5 B666TJ A1Q CQ E IQ MQ QQ F- DT5OV EHJ& OO- BT6OTJ CQ DQ EQ F	7158
L E5 B666TTT&J E FQ F1UU1 OQ	6669
L E5 B666TTT&J E FQ GQ	6605
L E5 B666TTT&J E FQ OQ	6605, 6682, 6716, 6721, 6722, 6783, 7192
L E6 B666J	6641, 6695

WLN	ABSTRACT NUMBER
L E6 D6656 1A T&&&T&J R	6641, 6691, 6692, 6695, 6697, 6698, 6713, 6924
L G6 D6 B666J	6641
L666 B6 2AB PJ	6641
ONN1&1	6602, 6710, 6712, 6714
ONN2&2	6002, 6707, 6708, 6709
ON1&UN1	6703
OS1&1	6836, 6837
QOXR	6691
QR DV2& 2U	6716, 6721, 6722
QVYQYQVQ & 2 &621 T6NJ C1 2/XV/ &622	6690
ROPO&OR&OR	6689
T C666 BNJ EG IMY&3N2&2 LO1 &GH &GH	6711
T C666 BNJ EZ MZ	6837
T C666 BO EV INJ D FZ N G- K-/VM -OT5-16- AN FVN IVN LVO PVM SVTJ G J KY N	6391, 6631, 7166
T D3 B556 BN EM JV MVTTT&J GO1 H1OVZ KZ L	6683, 6850
T F5 C6 B655 DOV GV OO QO RUT&&TTJ LO1	6666, 6668, 6669
T F5 C6 B655 DOV GV OO QOT&&TTJ LO1	6666
T5OJ B1MR CG FVQ DSZW	7158
T5OV EHJ CQ DQ EYQ1Q	6678
T5OJ BNW E- ET5N CSJ BMVH	6683
T56 BM DN FMYMVJ GUM	6710
T56 BM DN FNVNVJ F H	6641
T56 BN DN FNVNVJ B F H	6714
T6MPOTJ BO BN2G2G	6719, 7159
T6NJ DVMZ	6706
T6NVMVJ EE A- ET5OTJ B1Q CQ -A&C	6633, 6715, 69 7179
T6NVMVJ EF A- ET5OTJ B1Q CQ	6863
T6NVMVJ EI A- ET5OTJ B1Q CQ -A&C	7159
T6VMVMV FHJ F2 FR	6690, 6691, 67
T6VMVNV FHJ D F F- AL6UTJ	6707
T6VMVNV FHJ D F F- AL6UTJ &-NA-	6694
T6VMVTJ E1YQ- BL6VTJ D F	6717
T66 BM DN FN HNJ IS- ET5N ONJ DNW	6965
T66 BNJ BO EMQ	6711
T66 BNJ BO ENW	6711
WNMYUM&N1&NO	6713
WS1&O1	6713
WS1&O2	6667, 6713, 67
ZH	6836
ZR	6688, 6694

LN	ABSTRACT NUMBER
B	6688
B D	6688
B DNUNR B	6602
B F	6688
BG	6688
C	6688
CG	6688
D	6688
DG	6688, 6690
DNW	6688
DSWR DZ	6690
WR DZ	6690
N1&NO	6713, 6718
N2&NO	6713
O2	6602, 6717
1R	6690
M4M3Z	7177
M1	6703, 6704
N1&R	6091
N1&R DNUNR	6675
N1&R DNUNR B	6677
N1&R DNUNR C	6671, 6686, 6687

WLN	ABSTRACT NUMBER
1OSWO1	6718
2OPS&O2& 2O	6690
3XR&R&VO2N2&2 &GH	6690

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